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Journal of ORAL SURGERY

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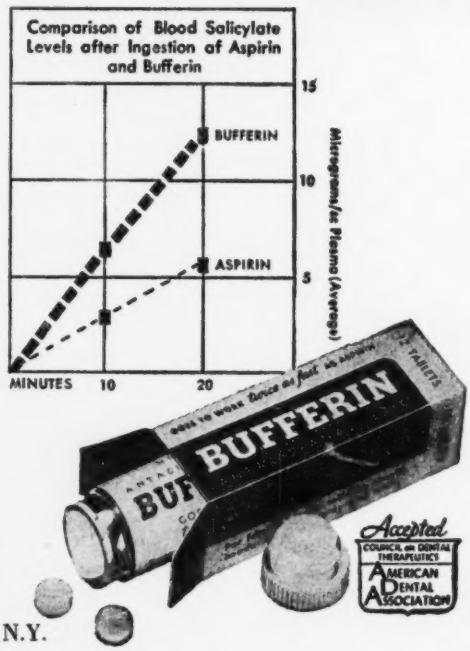

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A JOURNAL
DEVOTED TO THE ART
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JOURNAL OF ORAL SURGERY

Fred A. Henny, D.D.S., Editor
HENRY FORD HOSPITAL, DETROIT

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Oral lymphosarcoma

■ *Harry M. Seldin, D.D.S.; S. Daniel Seldin, D.D.S., and William Rakower, D.D.S., New York*

Lymphosarcoma, one of the rarest forms of lymphoma, was described originally by Kundrat. It is a highly malignant, invasive tumor composed of mature or immature lymphocytes. Mitoses usually are numerous. The cells are uniformly round with rather scanty basophilic cytoplasm and a nucleus containing heavy masses of chromatin.[1]

This disease may develop wherever lymphoid tissue is present. It may be generalized with widespread metastases, or localized involving only a single group of glands or lymphoid aggregate.[2] Unless leukemia develops, the peripheral blood picture shows nothing diagnostic or characteristic.[1] The bones and lungs rarely are involved, while the tonsil is often the site of the disease.[1] Skeletal invasion is usually a terminal phenomenon.[3]

The disease is more common in men than in women. It is commonest in early childhood and is again found in the later decades. It is extremely rare between the ages of 20 and 40.[1]

Although several reported cases of lymphosarcoma of the cervicofacial region have been associated with chronic nasopharyngeal or oral infection, the etiology of the disease is still unknown.[4, 5]

The treatment of choice is with roentgen ray therapy. Remissions however, have been observed with the use of nitrogen mustards and, recently, ACTH and cortisone.[6] Triethylene melamine, an agent closely allied to nitrogen mustard in its pharmacological action, has become available. Its chief advantage over nitrogen mustard is that it can be administered orally.[7] If the disease has a single center

1. Jackson, H., Jr., and Parker, F., Jr. Hodgkin's disease and allied disorders. New York, Oxford University Press, 1947.

2. Johnson, A. E.; Stenstrom, K. W., and Waldron, C. W. Multiple lymphosarcoma (lymphoblastoma) of the oral and cervical regions. J. Oral Surg. 4:159 April 1946.

3. Coley, B. L. Neoplasms of bone and related conditions. New York, Paul B. Hoeber, Inc., 1949.

4. Craver, L. F. Lymphomas and leukemias; value of early diagnosis and treatment. J.A.M.A. 136:244 Jan. 24, 1948.

5. Fanale, S. J., and McCauley, H. B. Lymphosarcoma of dental interest. J. Oral Surg. 3:186 July 1945.

6. Smith, R. H. Treatment of leukemia and similar disorders. U. S. Armed Forces M. J. 2:1787 Dec. 1951.

7. Treatment of lymphosarcoma—Coley's fluid. Queries and minor notes. J.A.M.A. 148:589 Feb. 16, 1952.

Fig. 1—(Case 1) Occlusal roentgenogram taken August 17, 1948

of origin and is treated early, the chances of cure are increased.[4] The possibility of improved results for localized lymphosarcoma by means of extirpative surgical procedures, to be followed by local irradiation has been suggested.[8]

The course of this disease is almost always progressive to death. The disease kills rapidly, especially in childhood. Sudden death may ensue even though the patient appears to be in comparatively good health.[3]

There have been several reports in the literature of lymphosarcoma of the oral cavity.[2-5, 9-11]

■ *Report of Cases*

Four cases have come under our care.

CASE 1—The patient, a 61 year old white man, first came to the office on August 17, 1948. He complained of a swelling in the left cheek and infraorbital region, and gave a history of pain and swelling in this region which he had first noticed about eight days before. At that time he had consulted his dentist who lanced the region intraorally. Two days later the swelling had increased in size. The patient, during this time, had had several injections of penicillin, and he was then placed on oral penicillin. On August 16 he consulted a second dentist who also opened into the region, continued the oral penicillin, and referred him to our office. When seen on August 17 the patient appeared sick, and had a large fluctuant swelling which involved the left cheek, infraorbital region and upper left lip. His temperature was 99°F. No cervical glands were palpable.

The roentgenographic examination showed no obvious pathologic bone condition but suggested a slight erosion of bone in the maxillary left bicuspid region (Fig. 1). Under general anesthesia the intraoral incision was lengthened, and the region opened with a hemostat. A seropurulent fluid was obtained. The impression at the time of operation was that this was an acute infection which had not adequately drained. The patient was continued on daily intramuscular penicillin injections.

The drain was changed on August 18 and 20. The patient's general condition was about the same. The swelling, six days after our initial incision, was larger and firmer than would be expected were this the usual type of infection. His temperature was 98.3°. It was decided,

8. Sugarbaker, E. D., and Craver, L. F. Lymphosarcoma. J.A.M.A. 115:17 July 6; 115:112 July 13, 1940.

9. Christiansen, G. W. Lymphosarcoma of the jaws and palate. J.A.D.A. 25:728 May 1938.

10. Penhale, K. W. Primary lymphosarcoma of the mandible. J. Oral Surg. 1:48 Jan. 1943.

11. Freedman, L. J. Primary lymphosarcoma of the hard palate. Am. J. Roentgenology 43:702 May 1940.

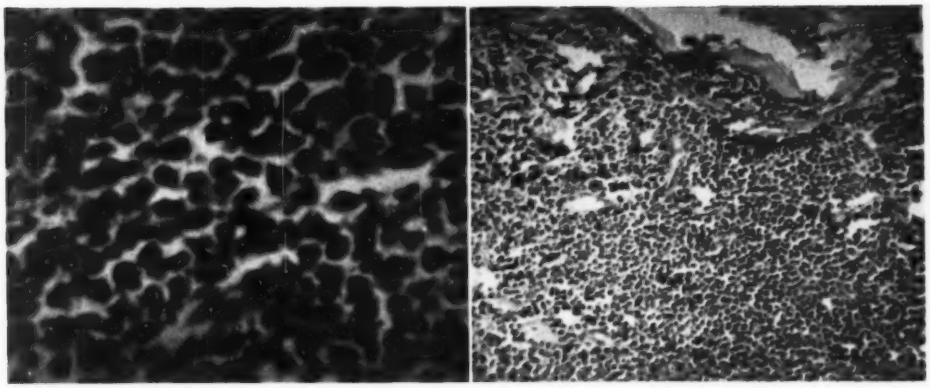

Fig. 2—(Case 1) Photomicrographs of specimen. High and low magnification

therefore, to open the region for exploration and possible biopsy. This was done under general anesthesia on August 23. A complete blood count and urinalysis was ordered. Two pieces of fairly firm blood-stained tissue were sent for microscopic examination.

PATHOLOGIST'S REPORT—Two fragments of specimen showed the tumor to advantage. In one fragment, marginal epithelium which was hyperplastic overlay a vast subsurface zone in which the hyperchromatic nuclei of the cells littered the tissue and had no definable pattern. These nuclei varied widely in size and shape. In fact the cells were "all nucleus" with only a crescentic rim of cytoplasm. The cells carried a poorly defined sclerosing vascular net with them. In the other fragment the malignant cells were deep to a surface slough. Here they were larger, paler but "all nucleus" and sprawled over one another without restraint. Nucleoli were quite prominent and atypical mitoses were not rare. Here some of the smaller vascular branches of the matrix had ruptured and red cells were free among the anaplastic cells. In the second fragment, the roof epithelium had proliferated widely to form a papillary tab. Subsurface tissues were seeded with cells which were without doubt derived from the same root as those described in the other fragment. Tissues of this fragment were sclerosed, however, and "unreadable."

The diagnosis was malignant lymphoma (Fig. 2).

The patient was referred to a radiation therapeutist.

On August 27 the lower left cuspid and lower left third molar were removed in preparation for the roentgen therapy. He was seen on September 3 at which time the operative sites were healing well (Fig. 3). After this, however, his general physical condition became progressively worse and on September 8 he was admitted to the Neurological Institute of New York. A communication from the Neurological Institute on September 13 stated in part:

The patient has a complete transverse myelitis at the fourth thoracic level presumably due to a deposit of tumor. He has a large soft tissue mass overlying the lumbar spine. He has urinary retention. In addition there is apparently intestinal obstruction plus ascites. He has painful ribs presumably due to metastases there. The obvious lesions are being treated with deep x-ray therapy. The intestinal obstruction is being treated conservatively with Miller-Abbott tube. The other conditions are being treated in symptomatic and conservative fashion as indicated.

On September 23 a communication from his physican stated that there had been a massive recurrence of the tumor in the lip and cheek of the left side and also in the neck. The patient continued to run a downhill course and died on October 5, 1948.

CASE 2—The patient, a 54 year old white man, robust, ruddy and apparently in good health, came for examination on July 13, 1950, having been referred by his dentist.

His chief complaint was a swelling on the gingiva in the upper right lateral region and a swelling of the glands in the right side of his neck (Fig. 4).

He had visited his dentist on July 5, 1950 with the same complaint. At that time he told the dentist he had first noticed the mass of tissue on the gingiva overlying the maxillary right lateral incisor about six weeks previously.

Roentgenographic examination of the dentition by his dentist had revealed periodontal involvement of the lower right second molar and upper right lateral incisor (Fig. 5). Since the teeth were mobile, the dentist had extracted them under local anesthesia. After a week of daily penicillin therapy, when no improvement had been seen, the patient had been referred to our office. The cervical nodes had apparently become involved only a few days before his first visit to us. He also revealed that he had lost five pounds in the previous month.

On examination, swelling of the nodes of the right cervical region could be seen. On palpation these nodes could be felt to extend from the right submaxillary

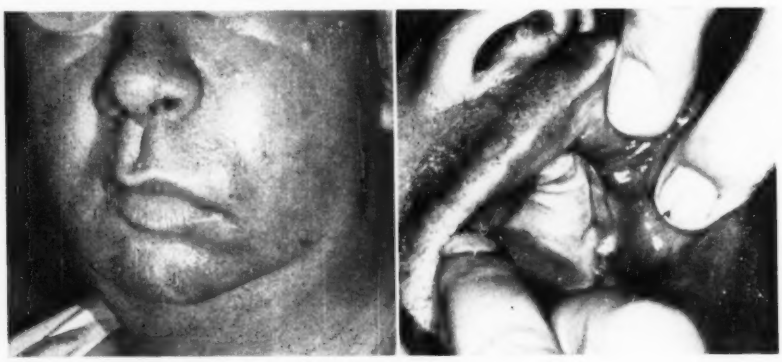

Fig. 3—(Case 1) Left: Appearance of patient on September 3, 1948. Right: Firm mass obliterating mucobuccal fold

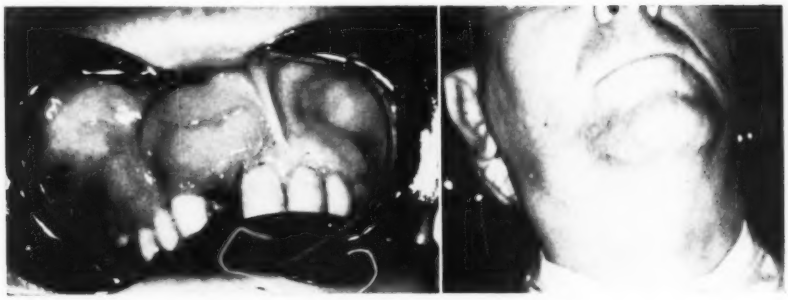

Fig. 4—(Case 2) Left: Appearance of oral lesion July 13, 1950. Right: Enlargement of right cervical nodes

region down the right side of the neck to the supraclavicular region.

Examination of the oral cavity revealed a lower right second molar socket which was healing normally. The socket of the upper right lateral incisor was healing, but on the gingiva overlying it, there was a large bulging sessile mass covered with mucous membrane and extending up to the mucobuccal fold. There was no pain.

Roentgenograms revealed an absorption of the bone of the alveolar crest in the maxillary right lateral incisor region (Fig. 6). Other than this there was no evident pathologic bone condition.

Under local anesthesia, a portion of the mass in the region of the alveolar crest was excised for examination. There was some bleeding which was controlled with oxidized cellulose and one suture. The tissue was sent for biopsy.

PATHOLOLGIST'S REPORT—A diamond-shaped wedge of mucous membrane was none too firm. It was rough, granular and discolored on surface (ulcerated).

Ulceration of the gross specimen was seen to advantage on sectioning. The reason for ulceration became clear. Subsurface tissues were almost solid with cells. Proliferation of mononuclear cells whose nuclei were of two sizes, large and small, was unrestrained. The nucleus of the larger cell, although roughly round to oval, varied in shape. Its chromatin was chunky and condensed at the periphery. These cells overran the tissues, displacing and replacing all indigenous structures down to the cutting line of surgery. They failed to show even the most primitive pattern.

The diagnosis was malignant lymphoma (Fig. 7).

Careful physical evaluation was obtained prior to radiation therapy. A complete blood count and a sternal marrow examination were done. The hematologist reported:

> Except for a slight leukopenia, the count is within normal limits. The bone marrow is hyperplastic and shows a slight shift to the left with a few eosinophils. No abnormal cells are seen, and there is no evidence of leukemia. A definite diagnosis cannot be made. Hodgkin's disease is a possibility.

Roentgenographic examination of the paranasal sinuses showed a thickening

Fig. 5–(Case 2) Roentgenograms taken by patient's dentist on July 5, 1950. Note bone absorption about the upper right lateral incisor

of the lining mucosa of the right antrum in the floor and facial wall. The bony walls were normal. The radiologist reported that from July 21 to September 1 a course of roentgen therapy was directed to the right antrum and right submaxillary triangle. All the enlarged nodes disappeared. The patient tolerated the treatment well. He was free from symptoms until September 18, 1950 when proptosis of the right eye suddenly appeared. On examination, the right eye was found to be proptotic and fixed and vision was absent. There was swelling and eversion of the eyelids. Roentgenographic examination of the chest was negative. The sinuses showed regression in the thickening of the lining membrane of the right antrum. The right orbit was slightly hazy but that was consistent with the soft tissue mass which was present. From September 22 until October 12 a course of irradiation therapy was directed to both orbits. During the therapy, the proptosis of the right eye receded completely and vision was restored almost to normal. At one time there was evidence of involvement of the left orbit which was indicated by limitation of movement, injection of the conjunctiva and swelling of the left upper eyelid medially. On another occasion there was an infraorbital swelling on the right side. All these regions responded well to treatment. However, three small reddish intracutaneous nodular swellings appeared on the right cheek. On October 20 both eyes were normal in position. New skin infiltrates appeared in the left cheek and left submaxillary region. Glandular swelling appeared in both submaxillary triangles. There was also enlargement of the right testicle.

On October 22 the patient was admitted to Mt. Sinai Hospital and received a course of nitrogen mustard therapy. At the time of admission his temperature was 103°. He responded well to this therapy. He was discharged from the hos-

pital on October 27. He returned for examination on November 3 and at that time there was no evidence of disease except for a slight thickening of the medial portion of the left upper eyelid.

On November 12 he was re-admitted to Mt. Sinai Hospital with considerable weakness, a temperature of 102°, and closure of the left eye by a swollen upper eyelid. Since the white blood cell count was 950, nitrogen mustard therapy was ruled out. Instead, intramuscular injection of 100 mg. of cortisone was given daily. There was no response to this therapy, although the white blood cell count went up to about 2,500. Weakness became greater, and temperature was high. The swelling of the left upper eyelid increased, and swelling of both upper and lower eyelids on the right side recurred. There was no recurrence of the testicular swelling. A chest roentgenogram was essentially negative. However, the patient's general condition deteriorated, his pulse became more rapid and irregular, he became confused and disoriented and expired on December 4, 1950.

CASE 3—On March 30, 1951 a 29 year old white girl came for examination, having been referred by her dentist. Her chief complaint was a swelling below the right angle of the mandible (Fig. 8). This swelling had been noticed first about four months previously. The patient had not noticed any change in the size of the mass during this time. There was no pain. She had consulted her physician who, believing the mass to be of dental origin, had referred her to her dentist.

Intraoral roentgenograms were taken on March 3, 1951 (Fig. 9). On March 10, 1951, her dentist removed the upper right first, second and third molars; and

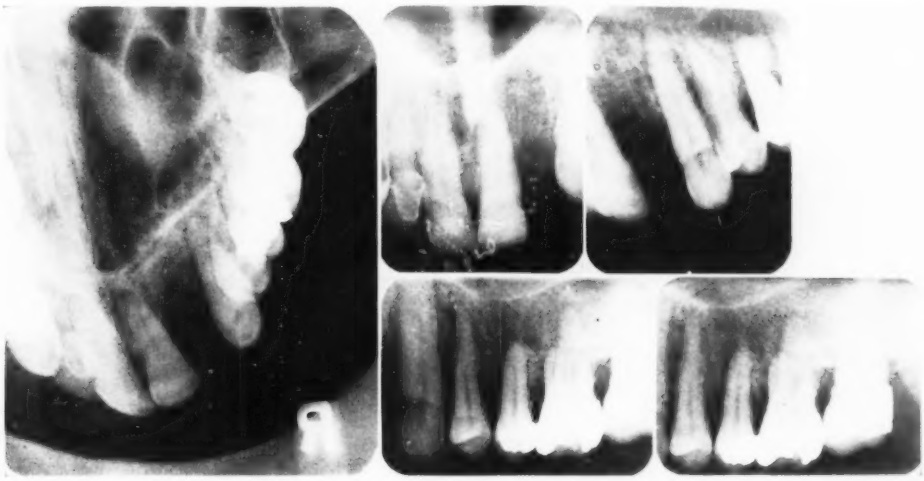

Fig. 6—(Case 2) Intraoral roentgenograms taken on July 13, 1950. There is a pronounced loss of bone in the edentulous upper right lateral region

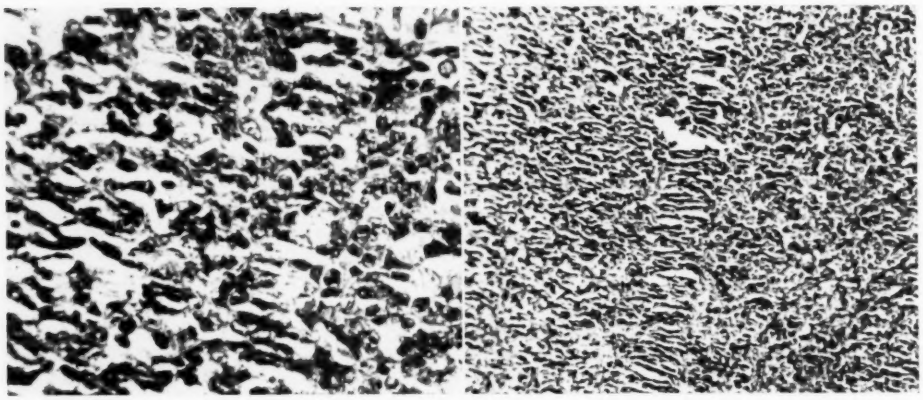

Fig. 7—(Case 2) Photomicrograph of specimen. High and low magnification

on March 24 he removed the lower right first and second bicuspids and first, second and third molars. During this time intramuscular penicillin was administered. When no improvement in the size of the swelling was noted after this treatment, the patient was referred to our office.

On examination a large, soft, movable, bilobular mass could be palpated in the region of the right submaxillary gland.

Fig. 8—(Case 3) Photograph taken March 30, 1951 showing swelling in right submaxillary triangle

Pressure against the mass in this region forced it up to the floor of the mouth where it could be palpated easily. There was no tenderness or swelling in the mucobuccal fold or gingiva. There was no trismus.

Roentgenograms showed the healing sockets of some recently extracted lower molars (Fig. 10). No other pathologic condition could be seen.

A tentative preoperative diagnosis of neoplasm or dermoid cyst was made, and the patient was scheduled for operation the following week.

On April 6, under general anesthesia using thiamylal sodium, nitrous oxide and oxygen, the mass was approached intraorally. An incision was made in the floor of the mouth directly over the mass, and then it was reached by blunt dissection. The procedure was facilitated by having the assistant constantly apply pressure with the fingers against the skin overlying the mass, thus forcing it up into the floor of the mouth and at the same time immobilizing it. As a result, once the intra-

oral dissection was completed, pressure from the assistant's hand over the mass was enough to squeeze large portions of the yellowish, soft, glandlike substance into the mouth. In this manner all palpable and visible portions of this tissue were removed. The incision was closed with four sutures, and the patient was given 600,000 units of penicillin intramuscularly.

It was the impression at the time of operation that this lesion was a tumor of the submaxillary salivary gland. The tissue was sent for microscopic examination. The postoperative course was uneventful, the swelling was reducing in size and the patient felt better.

PATHOLOGIST'S REPORT—There were two large pieces of rather soft white tissue of mucoid consistency, as well as a mucoid mass, small with stringy adherent tissue

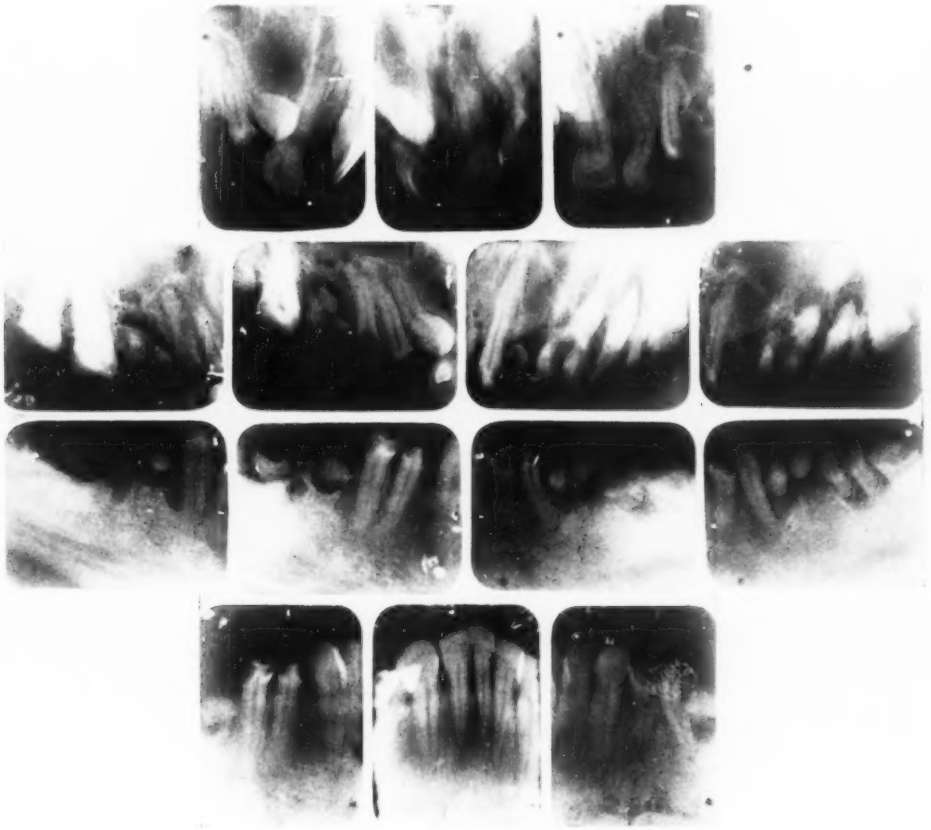

Fig. 9—(Case 3) Series of roentgenograms taken by patient's dentist on March 3, 1951

Fig. 10—(Case 3) Intraoral roentgenograms of mandible taken March 30, 1951

and a shiny mucoidlike piece examined.

The first three sections showed the growth to advantage. Everywhere it was phenomenally cellular. The cells piled up in profusion, proliferating without restraint and with a minimal skeletal stroma. The leading cell was a large pale vesicular cell, all nucleus. It was almost transparent with chromatin collected in chunks. These large cells were found in relation to smaller darker cells, also all nucleus, obviously lymphocytes. The latter were found only in "seams" through the cell mass and were obviously being crowded out, displaced and replaced by the larger vesicular cells. The final section showed nothing but a packet or nest of normal mucous glands and serving ducts.

The diagnosis was reticulum cell lymphosarcoma (Fig. 11).

The patient was referred for irradiation therapy. She was seen by the radiologist on April 19 at which time abnormal findings were restricted to the region of the right submaxillary triangle where there was a firm, fixed mass, palpable through the floor of the mouth. No other lymph nodes were palpable on either side of the neck. The spleen and liver were not palpable and the chest roentgenogram revealed no abnormality. The blood picture was essentially within normal limits.

Irradiation therapy was started on April 19 and completed on May 23. The patient received three treatments weekly.

Examination four months after completion of therapy revealed no evidence of disease. The appearance of the patient on November 20 is seen in Figure 12. At this time, careful examination of the right submaxillary triangle and floor of the mouth revealed no abnormality. The patient apparently was enjoying excellent health.

On February 6, 1952, however, the patient reported to her radiation therapeutist complaining of pain in the right lower quadrant which radiated down the leg. Examination showed no gross evidence of disease in the head or neck.

There was, however, a large mass of lymph nodes in the right inguinal region and a mass in the right lateral pelvic wall. This was thought to be an extension of the original condition and the patient was given radiotherapy.

CASE 4—The patient, a 73 year old white woman, first came to the office on February 11, 1952. She complained of a swelling of the right cheek in the upper molar region. She gave a history of having first noticed the mass about two to four weeks previously and stated that it had begun as an inflammation extending to the right periorbital region. She had used hot compresses on the outside of the face before consulting her dentist. When the swelling did not completely subside, she consulted her dentist who, after examining the patient, referred her to our office.

Examination revealed a slight swelling in the right cheek. The upper jaw was edentulous. Palpation revealed complete obliteration of the upper right posterior fornix by a mass lying under the mucous membrane. The mass was firm, immovable, and upon bimanual palpation a fluctuant sensation could be felt.

A posteroanterior view of the antrums showed a definite cloudiness of the right antrum with destruction of the lateral antral wall, and some erosion of the zygomatic process of the right maxilla (Fig. 13).

Under general anesthesia, using nitrous oxide-oxygen, the region was opened for exploration. An incision was made directly overlying the mass in the right posterior fornix. On retraction of the mucous membrane, a whitish, soft glandlike substance could be seen bulging underneath. A portion of the mass was removed for microscopic examination, and the incision was closed with three interrupted sutures. The impression at the time of operation was that this was an antral malignant growth, possibly lymphosarcoma.

The postoperative course was un-

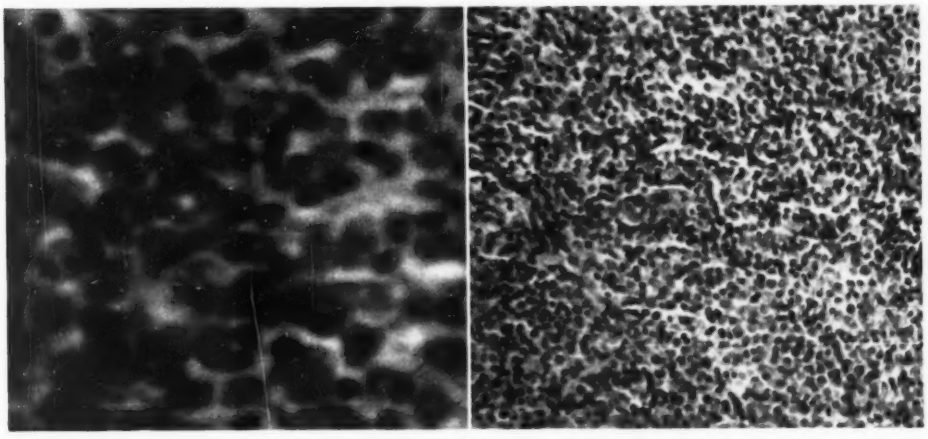

Fig. 11—(Case 3) Photomicrograph of specimen. High and low magnification

Fig. 12—(Case 3) Photograph of patient taken November 20, 1951. The original mass seen in Figure 8 has completely disappeared

eventful except for ecchymosis and some edema.

PATHOLOGIST'S REPORT—A flabby wedge of lobulated (polypoid?) tissue was examined.

The specimen could well have been characterized as "cell mass" if only because of the tight packing of its cells (diffuse, nonfollicular). The cells tended to replace even the skeletal stroma which served them as a frame. There was no trace of overt and no atypical pattern of covert epithelium. The cells seemed to derive from other sources; that is lymphoid tissue. Although "colonies" of atypical lymphocytes streaked the tissue, the predominating cells in the germinal regions of the tumor were large, clear, lucent cells, all nucleus. Chromatin collected in chunks in these nuclei and the nucleoli were large and prominent. These cells piled up in profusion, gave real bulk to the cellular mass and resembled cells of the germinal follicle or reticulum of lymphoid tissue. They did not fade out but were found to the very margins of the specimen.

The diagnosis was reticulum cell sarcoma (lymphosarcoma).

The patient was referred for irradiation therapy. Further roentgenograms were taken, the findings of which were consistent with the diagnosis of a malignant tumor of the right antrum. There was no indication of metastatic malignant disease in the chest.

The blood findings were normal.

It was planned to treat the disease involving the right antrum with irradiation through the right antrum anteriorly and the right side of the face laterally and also through the left antrum anteriorly and the left side of the face laterally, the beams to converge toward the posterior margin of the right antrum.

■ *Summary*

Four reports* of lymphosarcoma of the oral and cervical regions have been presented. Two of the patients were men, one 61 years old and the other 54 years old, and two were women, one 29 years old and the other 73 years old.

Blood counts in all cases were essentially normal at the time of biopsy.

All cases were treated with irradiation therapy. Case 2 had a course of nitrogen mustard and cortisone treatment after a recurrence which followed the first radiation therapy.

Two of the four patients reported have died (Cases 1 and 2). The first died about two months after his first consulta-

*A fifth case has come under our care since the writing of this article.

tion with his dentist, and the second died about five months after his first consultation with his dentist.

■ *Discussion*

The first three patients were originally treated with penicillin on the assumption that the lesions were infectious in origin. All but one (Case 4) gave a history of previous surgery, either incision for drainage or tooth extractions.

In Case 1, biopsy was delayed two weeks after the patient first sought dental consultation. A biopsy was performed for Case 2 only eight days after he first consulted his dentist. In the third case, the patient first consulted her physician who in turn referred her to her dentist. In Case 4 a biopsy was done without delay.

The patient in Case 1 had signs of the disease about eight days before seeking professional advice. In the second case, the oral lesion was noticed six weeks before and the cervical node just a few days before seeking professional consultation. The patient in the third case had a cervical swelling for three months before seeking help, while the patient in the fourth case waited about four weeks after noticing the first signs of the disease before seeking consultation.

Swelling of the cervical nodes is a phenomenon which the oral surgeon sees daily in his practice. Usually such swellings are associated with some infection about the mouth, pharynx or face. It should be emphasized, however, that swelling of the cervical nodes is, by itself, no indication for the removal of teeth. In two of the cases discussed here (Cases 2 and 3), teeth were removed by the dentist on the basis of cervical swelling and the roentgenographic study. In none of the cases where teeth were removed were any of the cardinal dental signs of sensitivity to percussion, trismus or swelling in the buccal or lingual folds present.

Fig. 13—(Case 4) Posteroanterior view of antrums taken February 11, 1952. Note destruction of lateral wall of right maxillary sinus

■ *Conclusion*

Any enlarged lymph node demands immediate investigation. Any node which does not subside within three weeks should be regarded as a danger signal demanding complete investigation.[4]

Whenever there is a cervical nodular swelling with any concomitant abnormal lesion or apparent hypertrophy of tissue in the mouth, the first condition to be ruled out must be malignant growth (Case 2). A biopsy must be done at once.

It has been stressed that early diagnosis and treatment are extremely important in the control of malignant growths. It therefore behooves the practitioner to recognize the early symptoms. —57 *West Fifty-seventh Street.*

Oral involvement in osteopetrosis

■ *Milton Plotz,* M.D., and Harry J. Chakales,† M.D., Brooklyn, N. Y.*

Osteopetrosis, although rare, has important implications for the oral surgeon. References to it in medical literature are comparatively few; less than 200 cases have been reported so far. The only reference in the literature of oral medicine is the excellent survey by Gordon Winter[1] in 1945.

The nomenclature of this bizarre disease is confusing and misleading. Since 1926, it usually has been called osteopetrosis in this country. A common synonym is marble bones. Both names indicate the denseness of the bones involved, which is immediately apparent on any roentgenogram. Both are erroneous in that they evoke the idea of extreme hardness of bone. Actually, the bones, while dense, are not strong or hard; rather, they are chalky and brittle so that they fracture easily. There are many other synonyms, among them osteosclerosis fragilis generalisata and Albers-Schönberg disease. The latter term is perhaps best since it indicates the first to recognize this malady (Heinrich Albers-Schönberg, 1904) and it has the further advantage of being noncommittal with regard to the obscure pathologic changes resulting from the disease.

This bone dysplasia is familial and congenital. It may be recognized in roentgenograms of the foetus. It may or may not be present at birth but is usually evident in childhood so that the pediatrician makes the diagnosis. Few patients survive to adult life; our patient, who was in her forties, is an exception.

The fundamental change in osteopetrosis, which accounts for all the symptoms and signs, is disorganization in bone structure which is the result not of excessive bone formation,[2] as might be supposed, but of defective bone resorption. It should be borne in mind that the ultimate structure of bone is the result of a constant balance between bone formation and bone resorption. An imbalance in either direction will result in increased bone density.

In osteopetrosis, the characteristic structure of adult bone is lost. The cortex is extremely thick and encroaches on the medulla and on any foramens in the bone. The texture of the bone is chalky and brittle so that it can be drilled easily. The skeleton is fragile, and fractures are frequent after even slight trauma. Obliteration of the blood-forming marrow results in anemia.

Changes within the skull are important. Overgrowth of the facial bones results in a characteristic facial appearance with "square jaws" so that there seems to

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1. Winter, G. R. Albers-Schönberg disease. Am. J. Orthodont. & Oral Surg. (Oral Surg. Sect.) 31:637 Nov. 1945.

2. Zawisch-Ossenitz, C. Marble bone disease; a study of osteogenesis. Arch. Path. 43:55 Jan. 1947.

be a family resemblance among all the victims (illustration, left). This facies, superficially like acromegaly, should put the dentist on the alert. The bones of the jaw are extremely dense and, as evident in the accompanying illustration, have an unmistakable appearance on roentgenographic examination. Obliteration of the cranial nerve foramens may result in cranial nerve palsies. The skull itself appears devoid of fine structure on the roentgenogram[3] (the "pottery skull") and the nerve foramens may fail to show. Likewise, the foramens containing the alveolar arteries may be narrowed so that less blood is carried to the jaw, and necrosis may occur after dental caries or after any operative procedure.

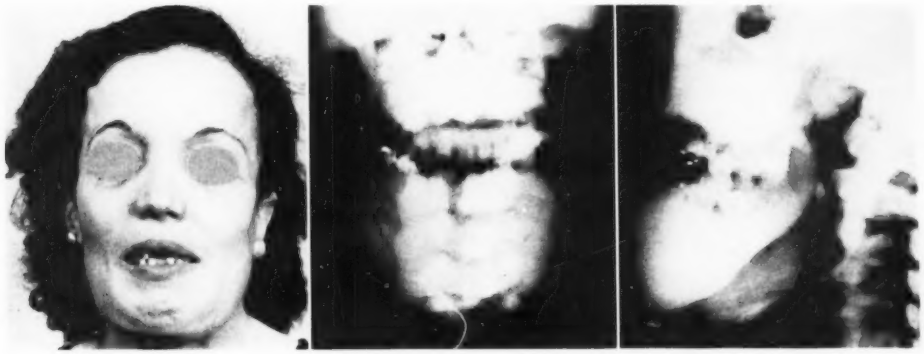
Winter[1] points out that the teeth erupt late as the result of bone sclerosis or faulty development of the tooth buds or of the general skeletal structure. Caries takes place early, and other defects have been noted such as hypoplastic teeth, oligodontia, overgrowth of the mandible, prognathism, and progressive spreading of the teeth with resulting malocclusion. In any event, osteomyelitis of the jaw is a dreaded complication and has resulted in five deaths after dental infection and two cases of complete sequestration of the mandible.

It should be evident by now why it is so important to identify persons with osteopetrosis and why special care in their oral management is called for. The correct diagnosis should be suggested by any of the following, especially in combination: (1) anemia, (2) tendency to easy fracture, (3) characteristic facies, (4) cranial nerve palsies, or (5) unusual bone denseness as shown in dental films. The diagnosis can be established beyond doubt by further roentgenographic study of the skeleton.

■ *Differential Diagnosis*

It is usually easy to make a differential diagnosis once the possibility that the patient has this disease is considered. In no other disease is increased density of

3. Brailsford, J. F. Sclerosing conditions of bone. Brit. J. Radiol. 23:83 Feb. 1950.



Left: Patient at time of admission to hospital. Center: Anteroposterior extraoral view. Right: Lateral extraoral view.

bone seen in such a large proportion of the skeleton. Individual bones may be thicker than normal, as occurs in syphilis, but there is not such widespread involvement.

Fluorosis may produce increased bone density, but the mottling of the teeth seen in this condition has not been found in osteopetrosis.

The three diseases which are most likely to cause confusion in diagnosis are Paget's disease, generalized carcinomatosis of bone, and osteomyelosclerosis of anemia and leukemia. In none of these is the bone density as pronounced or as widespread as in osteopetrosis. Most difficulty may be encountered in ruling out the blood dyscrasias. As Brailsford[3] points out, however, the roentgenogram does not begin to resemble osteopetrosis until the dyscrasia is advanced and the peripheral blood picture is diagnostic.

Generally speaking, little difficulty will be encountered in making the diagnosis once the disease is suspected and roentgenographic studies are made.

■ *Report of Case*

The patient was a married Italian housewife, 42 years old, who was admitted to the Bushwick Hospital because of vaginal bleeding and anemia. These symptoms were found to be the result of a fibrous tumor of the uterus which was successfully removed at operation.

It was observed that the patient seemed unusually massive and the contour of the face was "huge and bony." Subsequently, it was found that a brother had the same facial appearance. The patient reported that her mother and sister, both dead, had had the same characteristics and, presumably, the same disease.

The patient's mentality appeared somewhat dull and the hearing disturbed. On admission the skin was pale, but the color improved with correction of the anemia.

The patient showed a profound anemia when first seen, but this was largely the result of loss of blood because of the uterine tumor. Recently, the anemia has been found to be much more moderate: erythrocytes, 3.8 million per centimeter; hemoglobin, 11.5 Gm. The results of the blood determination as expressed in milligrams per 100 cc. were calcium, 10.9 mg.; phosphorus, 2.7 mg.; cholesterol, 248 mg.; the alkaline phosphatase, 3.7 units. All these findings were within normal limits which ruled out severe parathyroid disease.

Examination of the mouth showed a high palatine arch with overgrowth of the mandible. There was thickening of the periodontal membrane in the molar regions.

Roentgenographic examination of the mandible revealed extensive sclerosis and enlargement of the jaw to about three times normal size as the result of osteopetrosis.—*1120 Church Avenue.*

Neurilemmoma of the head and neck

■ *C. Dean Couch, Jr., D.D.S., Detroit*

Neurilemmoma is a neoplasm of a nerve sheath. It is a benign, slow-growing, painless encapsulated neoplasm with malignant potentialities. The general characteristics of the neoplasm, which is found in almost all parts of the body, are the same regardless of location. Its presence in the region of the head and neck creates anatomical problems which require special diagnostic and therapeutic consideration. Its comparative infrequency in that part of the body is evident from the paucity of case reports. Ehrlich and Martin[1] state that its occurrence there is one fiftieth as frequent as carcinoma of the lip.

■ *Origin and Terminology*

The literature indicates considerable confusion regarding the origin of the tumor and the terminology in reference to it.[1-6] Verocay[2,3] first described the neoplasm in 1908 and in 1910, believing that it was made up of nerve cells or their embryonal equivalents, termed it a "neurinoma." This term is not acceptable since it means nerve fiber tumor. The terms, "schwannoma," indicating ectodermal origin, and "perineurial fibroblastoma," indicating mesenchymal origin, express two opposing views as to histogenesis and terminology, neither of which is universally accepted. Since it is generally agreed by most authorities that neurilemmoma is a tumor of a nerve sheath or of the neurilemma, Stout's term "neurilemmoma" is the favored term, which is properly descriptive and at the same time not controversial as to the cellular origin of the tumor.

Histogenetically, a neurilemmoma does not arise from the axis-cylinder. The controversy is whether it is derived from the supporting connective tissue of the nerves or from the cells of the sheath of Schwann.

Penfield[7] and his followers believe the neoplasm to be of fibroblastic origin and therefore a mesenchymal neoplasm, since collagen fibers are laid down by the neoplastic cells. They contend that the neoplastic cells resemble the fibroblast morphologically and that only fibroblasts are capable of producing collagen. It has been demonstrated[8-10] that Schwann's

Department of oral surgery, Mount Carmel Mercy Hospital.

1. Ehrlich, H. E., and Martin, H. Schwannomas (neurilemomas) in the head and neck. Surg., Gynec. & Obst 76:577 May 1943.

2. Harkins, W. B. Neurinoma of the ethmoidal sinuses. Ann. Otol., Rhin. & Laryng. 58:498 June 1949.

3. Schroff, Joseph. Solitary neurofibroma of the oral cavity (neurilemmoma; neurinoma). J.A.D.A. 32:199 Feb. 1945.

4. Smith, T. T. Solitary neurofibroma of the larynx. Arch. Otolaryng. 39:144 Feb. 1944.

5. Stout, A. P. Peripheral manifestations of specific nerve sheath tumor (neurilemoma). Am. J. Cancer 24:751 Aug. 1935.

6. Willis, R. A. Pathology of tumours. St. Louis, C. V. Mosby Co., 1948, p. 828-841.

7. Penfield, W. The encapsulated tumors of the nervous system; meningeal fibroblastomata, perineurial fibroblastomata and neurofibromata of von Recklinghausen. Surg., Gynec. & Obst. 45:178 Aug. 1927.

8. Masson, P. Experimental and spontaneous schwannomas. Am. J. Path. 8:367 July 1932.

9. Murray, M. R., and Stout, A. P. Schwann cell versus fibroblast as origin of specific nerve sheath tumors; observations upon normal nerve sheaths and neurilemomas in vitro. Am. J. Path. 16:41 Jan. 1940.

10. Murray, M. R., and Stout, A. P. Demonstration of formation of reticulin by schwannian tumor cells in vitro. Am. J. Path. 18:585 July 1942.

cells, even though ectodermal in origin, can produce collagen.

Verocay[1, 3] hypothesized that the neoplasm must arise from the cells of Schwann and must therefore be ectodermal in origin. This assumption has been substantiated by Masson,[8] who produced experimental schwannomas and was able to trace both experimental and spontaneous neoplasms back to the syncytium of Schwann's cells. Masson[8] and Murray and Stout[9] later demonstrated by tissue cultures that the cells of these specific nerve sheath tumors are morphologically and physiologically similar to Schwann's cells. Murray and Stout[10] also cultivated the tumor *in vitro* and demonstrated the derivation of reticulum fibers from Schwann's cells.

■ *Clinical Features*

Neurilemmoma usually occurs as a solitary benign tumor located either superficially or deep in the skin or mucous membrane. When deeply situated, it is frequently related to the acoustic nerve, which is its most common site in the head. Bernier and Ash[11] state that when it occurs in the oral cavity, the tongue is its favorite site.

Its history usually reveals slow growth and long duration. In Stout's report[5] of 50 neurilemmomas, the average interval between appearance and removal was seven to eight years.

The age at which the neoplasm appeared was from six months to 65 years, four cases being evident in the first year of life. The cases presented indicate that it occurs equally in both sexes. Willis,[6] however, states that it is more apt to occur in females than in males.

Frequently the lesion is detected only by its physical presence; however, pain, tenderness and paresthesia are symptoms in about 50 per cent of the cases. If present, pain is due to pressure and does not arise in the nerve of origin.

■ *Gross Pathology*

Neurilemmomas vary in size from a few millimeters to several centimeters. The tumor may be globular or fusiform and smooth or lobulated. It is generally a firm and well-defined mass; however, large lesions may become soft and fluctuant because of myxomatous or cystic degeneration. When cut, the surface is usually glistening with a multiplicity of patterns. Mottled areas may be seen, usually arranged in whorls.

The position of the neoplasm in respect to the nerve depends largely on the size and complexity of the nerve involved.

■ *Histopathology*

A neurilemmoma is either encapsulated by or attached to the epineurium or perineurium. Willis[6] believes that a neoplasm which cannot be enucleated because it involves a nerve diffusely and without encapsulation is not a neurilemmoma. When present, the capsule is usually well supplied by blood vessels which do not penetrate the neoplasm in its entirety. Because the neoplasm has poor vascularization, areas of myxomatous degeneration may be present but are not a constant finding.

The outstanding histologic characteristic of the neoplasm is the arrangement

11. Bernier, J. L., and Ash, J. E. Atlas of dental and oral pathology, ed. 4. Washington, D. C., Registry Press, 1948, p. 159.

of large slender cells with elongated nuclei in palisade patterns or in whorls and eddies. In 1920, Antoni[1,2] distinguished two types of tissue or cell arrangement: Type A, fasciculated, and Type B, reticulated. A neurilemmoma is made up of varying amounts of each.

Type A tissue has a reticulum of long slender fibers which pass between cells with elongated nuclei and cytoplasmic processes that stream out to form a network. The intracellular fibers are in a parallel arrangement, while the elongated cell nuclei are lined up at the opposite end of the fibers. This arrangement produces a palisade pattern known as Verocay's bodies, which are characteristic of neurilemmoma. Areas of fibrosis and necrosis are usually seen in this portion of the neoplasm. Hemorrhage is frequent, and old blood pigment may be observed in the tissue. Thick-walled blood vessels, which are sometimes occluded by thrombi, tend to be unequally distributed. This necrotizing process produces areas in which fibers have disappeared and only cells remain or areas in which the reticulum is devoid of cells.

Type B tissue shows no orderly arrangement of cells and fibers and consequently no palisade pattern of nuclei. There is a loose texture due to an accumulation of intracellular fluid; and the appearance varies from one of edema, which dissects the tissue, to one of complete microscopic degeneration and the formation of cysts.

Willis[6] has added a third type of arrangement which he terms "epithelioid." Plump cells are present which are closely aggregated with either scanty intercellular spaces and fibers or with none. Over small areas these may resemble an epithelial structure, but elsewhere they are of Type A or B.

Degeneration into malignant neurilemmoma is not unknown. Microscopically, this type of neurilemmoma resembles the fibrosarcoma or spindle cell sarcoma, but in the benign lesion also wavy fibrils and minute whorls are observable.

■ *Diagnosis and Treatment*

Diagnosis of neurilemmoma is necessarily confined to histopathological examination. Clinical examination reveals a single, circumscribed, soft or firm, movable, nontender mass which is not clinically distinguishable from other encapsulated benign tumors.

Once the diagnosis of neurilemmoma has been made, treatment should be confined to complete excision with due consideration for the anatomy involved. If a major nerve trunk is involved, the neoplasm should be dissected out with a minimum of trauma and complete preservation of the nerve fibers. Although impairment of function occurs after nerve injury, medullated nerve fibers have regenerative capacities so that the loss of function is usually only temporary.

Even though the neoplastic cells are hyperchromatic and though complete enucleation is impossible, supplemental roentgenotherapy should not be used since nuerilemmoma is highly radio-resistant.

■ *Prognosis*

Relatively few neurilemmomas recur locally after complete surgical excision by enucleation. Most authorities[1,6,12,13] agree that malignant transformation can occur if the neoplastic process is left untreated;

however, the tendency to sarcomatous change is not as great as that observed in the lesion of von Recklinghausen's disease. Malignant metamorphosis is most often noted in the nerve trunks of the extremities.

■ *Case Reports*

Four cases observed at Mount Carmel Mercy Hospital provide illustrations of types of neurilemmoma.

CASE 1—A white 44 year old man entered the hospital on September 25, 1952, with a chief complaint of a lump in the left cheek. This lump had been noticed first about a year and a half before the examination, when the patient was having his teeth removed for complete dentures. Except for slow increase in size, the lesion had been asymptomatic.

Physical examination revealed a well-developed, well-nourished adult in no acute distress. Extraoral examination revealed a slight enlargement in the left infrazygomatic region. On palpation of the skin overlying this region, a movable, indurated, nontender mass with well-defined borders was felt. The dimensions of the lesion were approximately 3 by 1.5 cm. Further physical examination failed to reveal any other significant observations. Laboratory findings were within normal limits.

On the following day the neoplasm was excised with a local anesthetic. A linear incision was made in the left buccal mucosa anterior to and above the orifice of Stensen's duct. This incision was carried through the submucosal tissue and buccinator muscle before the lesion was exposed. The neoplasm, a firm, well-encapsulated, lobular mass, was enucleated without exposing the nerve of origin. A rubber drain was placed in the defect created, and the tissues were closed in the usual manner. Postoperative recovery was uneventful.

Gross pathological examination revealed a segment of tissue (Fig. 1, above) measuring 5 cm. in length and 1.5 cm. in its greatest diameter. Its surface was somewhat roughened, irregular and pale yellow in color. The mass was lobulated, firm to palpation and somewhat rubbery in consistency. The cut surface was pale whitish-yellow in color and revealed several lobules of yellow tissue which were scattered throughout the specimen. Most of the tissue was homogeneous and somewhat gelatinous. There was no evidence of cyst formation or calcification. The cut surface was slightly gritty when scraped with a knife.

Microscopic sections (Fig. 1, left) consisted of a neurogenic new growth characterized by moderately hyperchromatic spindle-shaped cells with slightly acidophilic cytoplasm and ill-defined cellular margins. While a diffuse arrangement formed the basis of the tumor, innumerable Verocay bodies were identified (Fig. 1, right). The latter consisted of parallel and opposing palisades of nuclei separated by a pink-staining matrix, apparently composed of collagen. The palisades varied from straight to sinuous alignment. With Masson's stain, the cells stained pink and the intervening substance green. Neither vascular nor inflam-

12. Ewing, James. Neoplastic diseases: A treatise on tumors. ed. 4. Philadelphia, W. B. Saunders Co., 1940, p. 163-165.

13. Karsner, Howard T. Human pathology. ed. 7. Philadelphia, J. B. Lippincott Co., 1949, p. 336 and 871.

matory changes were observable. No evidence of malignant transformation was noted.

The final diagnosis was neurilemmoma (Verocay Type 1).

CASE 2—A white 43 year old woman entered the hospital on November 4, 1949, with a chief complaint of a rapidly growing lump in the right cheek. The patient had been well until five weeks before the examination, when she first became aware of a nodule in her cheek. The lesion remained asymptomatic until an attempt at aspiration two weeks before admission. Since that time persistent pain had been present.

Physical examination revealed a well-developed, well-nourished adult not in acute distress. Extraoral examination re-

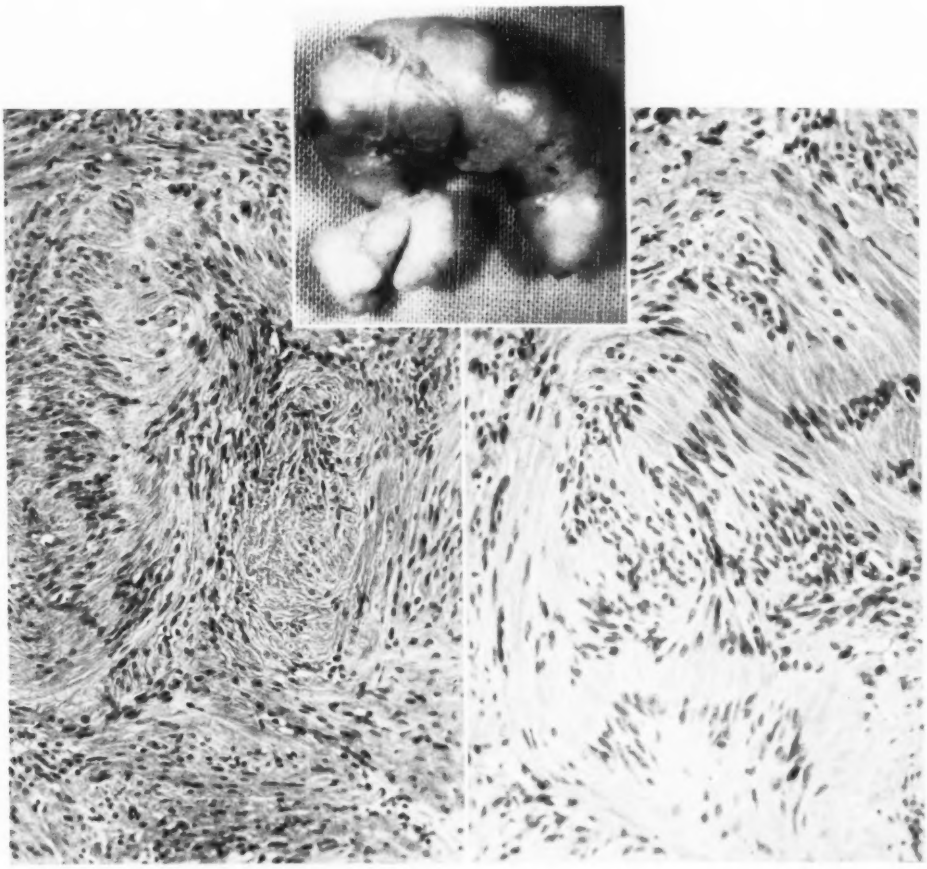


Fig. 1—Case 1. Above: Gross specimen of neurilemmoma. Note retort-shaped, lobulated, encapsulated appearance. Left: Palisade arrangement of spindle-shaped cells. Note somewhat whorled pattern. × 150. Right: Typical Verocay bodies. × 200

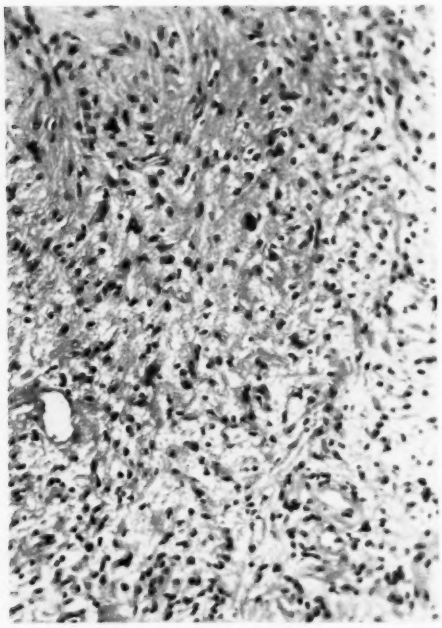


Fig. 2—Type B neurilemmoma (Antoni's type) in Case 2. Note loose pseudo-myxomatous pattern of spindle cells. × 150

vealed facial asymmetry on the right side. On palpation of the right buccal mucosa, an oval-shaped mass was felt which was definitely outlined, fluctuant, movable and noninflammatory. The mass was bounded superiorly by the zygomatic arch, inferiorly by the line of occlusion of the right maxillary teeth, anteriorly by the second bicuspid and posteriorly by the third molar region. Further routine physical examination failed to disclose other evidence of significant or contributory disease. Laboratory findings were within normal limits.

On the next day, with a general anesthetic the lesion was exposed through an incision in the right buccal mucosa following the path of the parotid duct. The incision revealed a lesion whose boundaries were more diffuse than they were thought to be on clinical examination. The consistency of the lesion varied from firm to cystlike. The entire mass could not be exposed, as it appeared to extend deep into the infratemporal space; however, all of the lesion that could be seen was excised by blunt and sharp dissection. A petroleum jelly gauze dressing was placed in the operative site. Postoperative recovery was uneventful.

Gross pathological examination revealed a specimen consisting of 14 irregular sections of tissue, of which the three largest were 3.5 by 2 cm., 2.5 by 2 cm. and 5 by 2 cm. The larger sections appeared to be part of a cyst wall varying in thickness from 1 to 3 mm. The largest portions of the sections were smooth and shiny and varied in color from yellowish-grey to pinkish-grey. The sections varied in character from gelatinous to cartilaginous. Attached to some of the sections were small amounts of soft bright yellow tissue, and on others there were areas of shiny greyish-white tissue of capillary appearance.

Microscopic examination revealed the sections (Fig. 2) to be characterized by slender, spindle-shaped cells arranged irregularly. Only a few inconspicuous whorls, probably of Verocay bodies, were noted. The cells were separated by varying amounts of collagenouslike tissue. In some areas the nuclei were arranged in the same plane, producing palisades or eddies. The nuclei were vesicular and showed no evidence of hyperchromatism or mitotic activity. There was no mucoid degeneration. In a few zones blood vessels

were prominent, and regions of recent hemorrhage extravasation were noted. There were zones of edema. There was no evidence of cystic, calcific or malignant transformation. A portion of the tumor was covered by a connective tissue capsule of obvious mesodermal character. External to the capsule there were a few skeletal muscle bundles.

The final diagnosis was neurinoma (neurilemmoma or schwannoma); no malignancy.

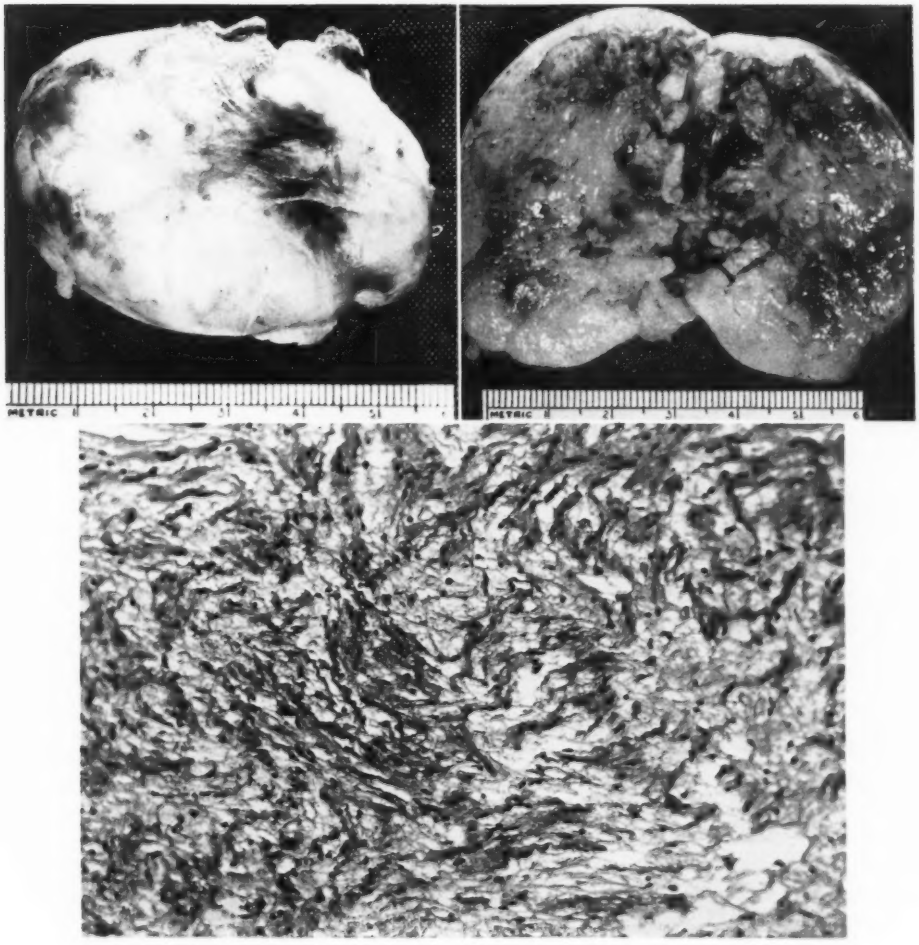


Fig. 3—Case 3. Above left: Gross specimen of neurilemmoma: slightly lobulated, encapsulated firm tumor. Above right: Cut surface of tumor. Note variegated surface with zones of recent hemorrhagic and cystic degeneration. Below: Specimen showing loose histologic structure without Verocay bodies. × 150

CASE 3—A white 18 year old man entered the hospital on February 25, 1946, with a chief complaint of a swelling in the back of the throat. He had first noticed this swelling when an upper respiratory infection had developed about five weeks previously. Because of the fullness and soreness in the throat the patient had had difficulty in swallowing, particularly solid foods. At the time of the examination his infection had subsided except for some soreness in the throat.

Physical examination revealed a well-developed, well-nourished adult in no apparent distress. Oral examination revealed a mass protruding from the left side of the pharyngeal wall extending from the posterior pillar of the fauces to the midline. The left tonsil was pushed anteriorly by the mass, which was about 6 by 4 cm. and showed moderate inflammation. Further physical examination failed to reveal any other significant observations.

Laboratory findings were within normal limits.

The next day with vinyl ether and ether anesthetic, an incision was made in the posterior pharyngeal wall, posterior to the left tonsil; and a tumor mass was encountered which appeared to be well encapsulated. A section was taken for biopsy. A diagnosis of neurinoma was made after microscopic examination.

On March 1, 1946, the tumor was excised with ether anesthetic. A vertical incision was made posterior to the left posterior pillar and through the pharyngeal musculature. This incision revealed a large mass, which was removed by blunt dissection. The tumor extended from the angle of the mandible to the midline of the pharynx. There was considerable bleeding, which was controlled with epinephrine sponges. The incision was closed with interrupted chromic sutures. Postoperative recovery was uneventful.

Gross pathological examination revealed an encapsulated firm, slightly lobulated tumor, 6.5 by 4.5 by 3 cm., showing some hemorrhagic extravasation into and beneath the capsule (Fig. 3, above left). There were two sections of perforation, which were probably the sites of the specimens taken for biopsy. The cut surface (Fig. 3, above right) presented a varicolored appearance due to minute sections of hemorrhagic degeneration, the largest measuring 6 mm. in diameter. There were also minute sections of yellowish-grey necrosis and some zones of translucent hydropic degeneration.

Microscopic examination revealed the mass (Fig. 3, below) to be composed of long slender cells with elongated, hyperchromatic nuclei, which were frequently arranged in parallel or palisade fashion and also in eddies. Between the cells there was a small amount of material, staining like collagen. There were few capillaries. The capsule had the appearance of hyalinizing connective tissue. There was no evidence of sarcomatous degeneration or infection.

The final diagnosis, neurinoma, confirmed the earlier one.

CASE 4—A white 14 year old girl entered the hospital on July 27, 1943, with a chief complaint of a mass in the neck. She had first become aware of this mass about one year before the examination. The lesion had become asymptomatic, except for occasional stabbing pains. There had been a slow increase in size.

Fig. 4—Type 1 neurilemmoma in Case 4. Note numerous Verocay bodies with palisades of nuclei separated by collagenlike matrix. × 150

Physical examination revealed a well-developed, well-nourished girl in no acute distress. Extraoral examination revealed a slight asymmetry in the right submaxillary region at the angle of the mandible anterior to the sternocleidomastoid muscle. On palpation of the skin overlying the lesion, a well-defined, movable, noninflamed, lobulated lesion was felt, which was about 2 by 2 by 2.5 cm. in diameter. Some telangiectasis of the skin overlying the neoplasm was noted. Further routine physical examination failed to reveal other evidence of significant or contributory disease. Results of laboratory examinations were within normal limits.

The next day with a general anesthetic, the neoplasm was exposed by an incision through the skin over the tumor mass. The mass, which was well encapsulated, was enucleated by blunt and sharp dissection. The incision was closed in the usual manner. Postoperative recovery was uneventful.

Gross pathological examination revealed an irregular mass of firm white tissue arranged in small lobules and partially covered by a transparent fibrous capsule. There were fibrous trabeculi dividing the tissue into larger lobules.

Microscopic examination revealed the specimen (Fig. 4) to be composed of lobules of tissue made up of masses of nuclei in a palisade pattern with intervening hyaline stroma. There was no evidence of malignancy.

The final diagnosis was neurinoma (schwannoma).

■ *Summary*

Neurilemmoma, a tumor of a nerve sheath, is rarely found in the head and neck. Most authorities agree that, histogenetically, it arises from the cells of the sheath of Schwann.

Neurilemmoma occurs as a solitary, benign tumor, the only symptom usually

being the physical presence of the tumor. The neoplasm may occur in both sexes and at any age.

Microscopically, neurilemmoma is characterized by a palisade pattern of cells which are large and slender with elongated nuclei. Malignant transformation may occur; the resultant neoplasm is a malignant neurilemmoma.

Diagnosis can be made by microscopic examination only; treatment is complete excision with care taken to dissect out the nerve involved if it is a major nerve trunk. Relatively few neurilemmomas recur after removal.

Follow-up examinations of the four cases reported in this article have revealed no evidence of recurrence of the neoplasm.

A method for closure of oroantral openings

■ *De Orr Cooley, D.D.S., M.S., San Jose, Calif.*

Several methods for closure of oroantral openings have been devised which have proved acceptable. The procedure to be described, although useful for closing only smaller defects, can be used to advantage if properly applied.

■ *Operation*

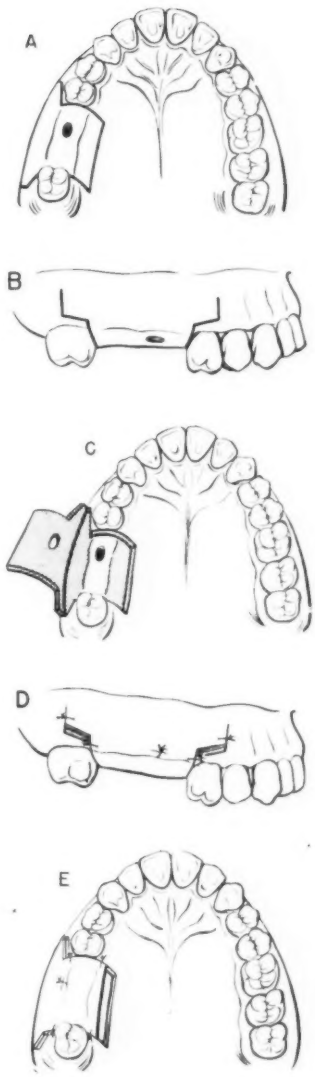
Two parallel incisions are made adjacent to the opposing surfaces of the two teeth bordering the edentulous area which contains the oroantral opening (illustration, A). These incisions are continued palatally and are terminated on the palate about 6 to 8 mm. from the crest of the edentulous ridge. The terminal ends of these incisions are then joined by a horizontal incision. The horizontal incision and those parts of the parallel incisions made on the palate are not carried through the entire thickness of the soft tissues but are extended to a depth of about 3 mm. The buccal extensions of the parallel incisions are then continued upward along the buccal surface of the ridge as two 70 degree angle diverging incisions (illustration, B). These incisions are extended on either side for about 8 mm. and are then terminated as two short vertical incisions. These terminal incisions are extended to about the point of reflection of the mucosa from the buccal surface of the gingiva.

Beginning along the horizontal incised margin, a palatal flap about 3 mm. thick is raised from the underlying soft structures. This flap is formed by sharp dissection until the mucoperiosteum of the palatal side of the ridge is reached at which point the full thickness of the mucoperiosteum here and that overlying the ridge are included in the flap. Continuing upward on the buccal surface of the ridge, the remainder of the outlined flap is elevated from the underlying bony surface (illustration, C). The entire flap is then repositioned buccally (usually about 5 mm.) until the orifice of the oroantral opening lies over solid bone and away from the bony antral opening with which it formerly communicated (illustration, D and E). Sutures then are placed along the terminal extensions of the buccal incisions and adjacent to the buccal and lingual surfaces of the involved teeth (illustration, D and E). The margins of the orifice are then freshened and approximated with 00000 Dermalon sutures on an atraumatic needle (illustration, D and E).

The repositioned flap and adjacent teeth then are thoroughly dried and a paste of zinc oxide and eugenol is applied so that it covers the flap and opposing surfaces of the teeth. This will splint the flap and protect it from food and mouth fluids. This dressing should not be disturbed for at least five days.

■ *Evaluation of Procedure*

This procedure is best adapted to small chronic oroantral openings located in large edentulous areas whose width is equal to or greater than that of two molar teeth. It also may be applied only to those defects whose orifices have a diameter



A: Outline of incision, occlusal view. B: Outline of incision, lateral view. C: Flap reflected. D: Repositioned flap, lateral view. E: Repositioned flap, occlusal view

less than one-fourth of the total width of the edentulous area involved.

This procedure should not be used to close an opening where a previously unsuccessful attempt had been made because of the diminished vascularity resulting from the formation of scar tissue.

DISADVANTAGES—The most logical objection to this procedure is that the palatal side of the flap is outlined in such a way as to interfere with the source of its principal blood supply. This objection will not appear too great, however, if it is considered that the vascular supply to this side of the flap is not entirely dependent on its palatal source but is also supplied by the superior alveolar arteries through anastomosing branches of these vessels with those of the palatine arteries.[1] This secondary vascular source will maintain the vitality of the flap.

It cannot be used to close large oroantral openings unless they are located in edentulous mouths where adequate tissue is available.

ADVANTAGES—It is a simple, time-saving procedure and disagreeable postoperative complications are kept at a minimum.

The bony opening into the antrum is covered with intact soft tissue and the soft tissue orifice formerly communicating with this opening is repositioned over healthy intact bone where it may heal undisturbed. This will help to prevent the closed defect from reopening which occurs frequently when the flap margins are approximated directly over the bony opening.

Reduction of the alveolar ridge is not required as it commonly is when other methods are used to close the opening.

PRECAUTION—In addition to the usual precautions which are necessary when closing an oroantral opening, the following are suggested when the method herein described is utilized.

1. Before this procedure is undertaken, the oral surgeon should make certain that there is no periodontal disease adjacent to the edentulous region from which the flap is to be raised.

2. It is wise not to inject the anesthetic solution either into the flap or along its base because the anesthetic produces ischemia.

3. It is recommended that fine sutures on an atraumatic needle be used to approximate the flap margins.

■ *Conclusions*

The true value of this operation, as of any operation, cannot be determined accurately until it has been applied in numerous cases. It may be used to advantage, however, if its limitations are recognized and if it is used only in those cases and under those conditions best adapted to its inherent potentialities. If these principles are adhered to, a reasonably high degree of success may be anticipated.—*405 St. Claire Building.*

1. Sicher, Harry. Oral anatomy. St. Louis, C. V. Mosby Co., 1949, p. 321-322.

Multiple extractions for the hemophiliac

■ *Frederick C. Nichols, D.D.S., M.S., St. Petersburg, Fla., and Odus L. Baldridge,* D.D.S., St. Louis*

Treatment of the hemophiliac presents one of the more difficult problems in dental practice, since unwarranted fear of possible operative sequelae has complicated the proper management of this disease. The poor status of dental health found in the average hemophiliac attests to the fact that many dentists are unwilling to provide any form of dental care for them. Consequently, they are forced to suffer the results of continued dental neglect until they reach the point where treatment of an emergency nature becomes imperative. It would seem, therefore, that if the true nature of the hemophiliac state were known sufficiently, some of the unfounded dread on the part of the practitioner might be eliminated, and they might thus be afforded the benefits of adequate and early restorative dental care. The comparative safety with which operative dentistry can be undertaken, as well as dental extractions, may be illustrated best by a review of the basic pathology of hemophilia, and by an evaluation of the measures which have been clinically demonstrated to be successful in the control of postsurgical hemorrhage.

An attempt will be made to base the dental management of the hemophiliac on sound principles and to point out that operative and surgical treatment may be safely offered these patients. Case reports will illustrate the various measures which have been found successful in managing four patients for whom operative procedures and multiple extractions were performed.

■ *Pathogenesis*

A recent report by Quick[1] aptly describes the conditions which characterize hemophilia. He details the clotting mechanism and its deficiencies with exactness, yet maintains clarity. It should be sufficient here to say that hemophilia is a sex-linked recessive hereditary disease occurring only in males but transmitted by females. Israels,[2] however, reported a well-documented case of hemophilia in a female.

The disease is characterized primarily by a prolonged clotting time, with all other blood studies within normal limits. According to Quick, thromboplastin, which is essential for the conversion of prothrombin to thrombin, is present in normal plasma as a precursor called thromboplastinogen. This substance is converted to free thromboplastin by an intermediate activator which is derived from disintegrating platelets. The three basic reactions in-

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1. Quick, A. J. Management of hemophilia in general practice. J.A.M.A. 145:4 Jan. 6, 1951.

2. Israels, M. C. G.; Lempert, H., and Gilbertson, E. Haemophilia in the female. Lancet 1:1375 June 30, 1951.

volved in the clotting process include the following:

1. Thromboplastinogen + platelet activator = thromboplastin
2. Thromboplastin + prothrombin complex X = thrombin (The complex X includes classic prothrombin, labile factor and organically bound calcium.)
3. Fibrinogen + thrombin = fibrin

In addition to converting fibrinogen to fibrin, thrombin helps to activate more thromboplastinogen by causing labilization of the platelets. A chain reaction thus is initiated which furthers clot formation. Lysis of the platelets induces liberation of a powerful vasoconstrictor, which is also one of the basic hemostatic factors. In hemophilia the primary deviation from the normal mechanism consists of a congenital and hereditary deficiency of thromboplastinogen. Without thromboplastinogen, very little thrombin can be formed and relatively few platelets disintegrate. The chain reaction thus cannot be initiated, and inadequate amounts of the vasoconstrictor agent are liberated.

This lack of thromboplastinogen explains the occurrence of prolonged bleeding which follows tissue injury in the hemophiliac. This explanation of the pathology of hemophilia also indicates why vitamin K, calcium gluconate and other such agents cannot possibly be of value in arresting hemorrhage for these patients. For the otherwise healthy hemophiliac, the blood levels of calcium and vitamin K are already high enough to meet the need for them in the clotting mechanism, so it is of no value to supply an excess in an attempt to improve the coagulability.

In past years, the classic finding of prolonged coagulation time in hemophilia, with all other blood studies within normal limits, has been the most important laboratory determination. Quick, however, has recently described a method whereby the severity of the disease in the hemophiliac can be quantitatively measured by determining the prothrombin consumption time. Since this method of analysis is far more specific than coagulation time determinations, variations in the severity of the disease can be ascertained more accurately. Through this new method the presence of hemophilia can be detected even before the onset of any hemorrhage, and this should be of value when there is a known familial history of the disease. Since it is known also that the tendency of the hemophiliac to bleed varies in degree at different times, the determination of the prothrombin consumption time may be an invaluable aid in selecting the most favorable period for elective oral surgery.

■ *Parahemophilia*

Parahemophilia is a rare form of blood dyscrasia first described by Owren[3] in 1947. It is characterized by a prolonged clotting time, as is true hemophilia, but the failure in the clotting mechanism is caused by the absence, not of thromboplastinogen, but of a previously unknown factor necessary for coagulation. Parahemophilia also differs from true hemophilia in that it is not considered hereditary.

In the classic description of the re-

3. Owren, P. A. Parahaemophilia: haemorrhagic diathesis due to absence of previously unknown clotting factor. Lancet 1:446 April 5, 1947.

actions which take place in the clotting of blood, the second series is written thus: Thromboplastin + prothrombin complex X = thrombin (complex X includes classic prothrombin, labile factor and organically bound calcium).

According to Owren, however, this concept is an oversimplification. He has demonstrated that in the afore-mentioned reaction there actually are two phases involving the so-called "labile factor." He states that the actual conversion of prothrombin to thrombin occurs under the influence of an enzyme termed "factor VI," in the presence of calcium. But he postulates the presence of a "factor V" which is a proenzyme necessary for the production of factor VI. Parahemophilia is caused by failure of the formation of factor VI owing to the lack of factor V, thus resulting in deficient formation of thrombin. The final result is the same in hemophilia and parahemophilia, but the differential diagnosis can be made because the faulty coagulation time in parahemophilia is not returned toward normal by the addition of thromboplastin as it is in hemophilia.

■ *Report of Cases*

Although the following case reports are offered in chronological order, only the last case will be presented in detail, since the background information and principles of treatment for each case were basically similar. Significant variations in technic involved in the several cases will be discussed later in the paper.

CASE 1—A 28 year old man had been hospitalized in St. Louis City Hospital because of hemophilia for five years prior to the request for dental care in May 1952. At the time of examination, nine teeth required extraction.

After the removal of one tooth, postoperative hemorrhage continued for eight days. On subsequent occasions, three and four teeth were removed, and postsurgical bleeding continued for ten days in each case. Prior to the final extraction, a total of eight small elastic bands were placed around the neck of the tooth for a period of 16 days. Only a few drops of blood were lost before bleeding ceased entirely 48 hours later.

The measures used to control hemorrhage for the various extractions included intermittent ice packs, atropine for control of excessive salivation, oxidized cellulose (Oxycel)-thrombin surface dressings for temporary hemostasis, gauze pressure packs, and daily transfusions of 250 cc. of fresh plasma.

CASE 2—A nine year old boy, a known parahemophiliac, was admitted to Barnes Hospital, St. Louis, in July 1952 for treatment of persistent bleeding of the gingival tissues. Eight deciduous teeth required extraction.

After the removal of two teeth, the sockets bled for three days, and after the later removal of six teeth, bleeding continued for four days.

Measures used to control hemorrhage included acrylic splints, absorbable gelatin sponge (Gelfoam) and thrombin surface dressings, ice packs and daily transfusions of 500 cc. of fresh whole blood.

CASE 3—A 29 year old man, a hemophiliac, was admitted to Barnes Hospital, St. Louis, in November 1952 for dental

extractions. Twelve teeth were indicated for extraction.

Elastic bands were placed around seven maxillary anterior teeth, with new bands added as the old bands moved toward the root apexes. The extraction of two maxillary molars was followed by six days of bleeding. Subsequent removal of three posterior teeth resulted in eight days of postoperative hemorrhage. The patient was then discharged from the hospital.

Measures used to control postsurgical bleeding included ice packs, oxidized cellulose (Oxycel)-thrombin (and Hemo-Pak-thrombin) surface dressings, dental compound splints, gauze pressure packs and daily transfusions of 250 cc. of plasma.

Over the next 18 weeks, the remaining six maxillary anterior teeth, all of which had had elastic bands on them for at least four weeks, were removed one at a time in the outpatient dental clinic. In no instance did postsurgical hemorrhage continue longer than 48 hours.

CASE 4—A 34 year old man, a hemophiliac, was advised to seek hospitalization for multiple dental extractions. The patient had been diagnosed as a hemophiliac in early childhood when excessive bleeding had followed slight trauma.

When the patient was ten years old, his eye had been injured. Subsequent intraorbital hemorrhage had resulted in complete loss of vision in that eye and later the eye had been enucleated because of corneal ulcer and replaced with an artificial prosthesis. The postoperative convalescence had been stormy, lasting several weeks. In 1950 the patient had been struck in the left eye by a piece of steel, and subsequent hemorrhage had resulted in complete blindness in that eye also.

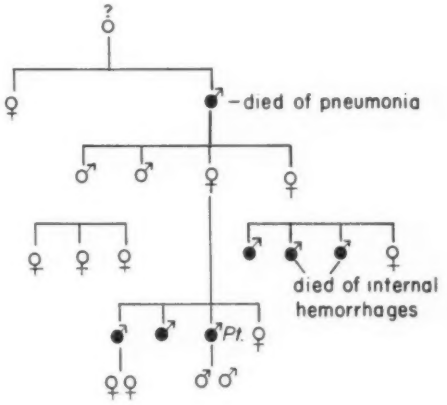
Three teeth had been extracted previously. Postsurgical hemorrhage had lasted 12 and 14 days. Treatment had included transfusions, vitamin K, calcium gluconate and gauze pressure packs. Extensive caries had since necessitated frequent attempts to secure dental care, but the patient had been refused treatment by every dentist contacted.

The patient's family history revealed that well-documented hemophilia had afflicted many of the men in the family. The patient was one of four children, three of whom were male. The history of hemophilia was traced back to the maternal grandfather. The patient's mother and her sister had three sons each, and his two brothers and one cousin had had some difficulties. Two cousins had died of uncontrollable internal hemorrhage. The illustration is a graphic representation of the family tree.

FIRST HOSPITAL ADMISSION—The patient was admitted to Barnes Hospital, St. Louis, on January 3, 1953 for dental extractions. Because of difficulty in securing a sufficient number of donors with type B Rh negative blood (a somewhat scarce blood type), and after consultation with the hematology and medicine services, a decision was made to remove all teeth in as few surgical procedures as possible. All maxillary and mandibular posterior and some anterior teeth were to be removed in only two operations. The risk involved in such multiple extractions was apparent, but the lack of adequate transfusion reserves necessitated the procedure in this case.

The laboratory findings on the patient's admission to the hospital showed urinalysis and stool, normal; complete blood count, within normal limits; blood type, B Rh negative; bleeding time, two minutes, 40 seconds; clotting time, 160 minutes.

Pentobarbital, 1½ grains, was administered three hours before operation. Morphine, 1/6 grain, and atropine, 1/150 grain, for hypodermic administration, were ordered to be on call to the operating room. Fresh plasma, 250 cc., was administered one and a half hours before the operation. A diet which would not require chewing was ordered.



Graphic representation of family tree of Case 4

OPERATIVE PROCEDURE—Under local infiltration anesthesia, ten left maxillary and mandibular posterior teeth were removed. Absorbable gelatin sponge (Gelfoam) saturated with thrombin was placed in each socket. Four silk sutures were placed in the molar areas, two in each arch. No incisions were made in the mucosa, and no reflection of tissue or contouring of bone was done. A splint was made of dental compound by placing a roll of softened compound between the operated arches and having the patient close his jaws to occlusion. The splint was then trimmed and a layer of oxidized cellulose (Oxycel) saturated with thrombin was placed over the ridge area. The splint was placed in position and the patient was returned to his ward.

POSTOPERATIVE COURSE—On the first postoperative day, the patient bled much more profusely than would be expected in a normal patient. The blood was aspirated and the splint removed and cleaned twice on the first day. Four hours after the operation, the patient was transfused with 250 cc. of fresh plasma. Twenty minutes after the transfusion was completed, the patient began sweating profusely and complained of an itching sensation about his neck and upper thorax. Large red wheals, one to two inches in diameter, appeared in the same area. The reaction was aborted within ten minutes after intravenous administration of 25 mg. of diphenhydramine hydrochloride. Continued profuse bleeding necessitated removal of the splint and reapplication of the oxidized cellulose (Oxycel)-thrombin dressings three times during the first night.

On the second postoperative day, the rate of hemorrhage increased during the early morning, particularly from the maxillary sockets. Packs in the form of individual gauze tampons saturated with thrombin were inserted in each maxillary socket. The patient was transfused with 250 cc. of fresh plasma at noon, and there

was no transfusion reaction. Because of lack of oral fluid intake, 1,500 cc. of 5 per cent glucose in saline solution was given. By evening blood clots filled the mouth so the splint was removed as were the gauze tampons. The splint seemed to be contributing to the recurrence of bleeding so it was discarded in favor of strips of oxidized cellulose (Oxycel). These were saturated in Monsel's solution, then blotted as dry as possible and placed over the bleeding areas. Folded gauze packs were inserted between the arches, and the patient closed his teeth almost into occlusion, with the gauze applying a slight pressure above and below. Another transfusion was given during the late evening and the bleeding ceased.

No bleeding developed during the third postoperative day. One transfusion of 250 cc. of fresh plasma was given. During the fourth postoperative day, no active bleeding developed, but several well-formed clots were evident. Plasma (250 cc.) was administered. Administration was followed by chills, a transfusion reaction, which was aborted with 15 grains of aspirin.

No bleeding occurred during the fifth postoperative day and although the treatment plan called for daily administration of plasma, no transfusion was given. On the sixth postoperative day, all sockets bled profusely by early morning. A transfusion of 250 cc. of plasma was given. The dressings of oxidized cellulose (Oxycel) and Monsel's solution were changed, and the bleeding was brought under control. A modified Barton bandage was applied to help the patient maintain gauze pack pressure while asleep.

Bleeding continued very slowly during the seventh to the tenth postoperative days, necessitating change of surface dressings two or three times daily. One transfusion was given each day, all without reaction.

On the eleventh postoperative day the rate of bleeding noticeably decreased. The patient's diet was changed to solid food and transfusions were discontinued.

Small well-formed clots were clinging to the surface in many areas on the twelfth postoperative day, but there was no active bleeding. No bleeding occurred during the next three days and the patient was discharged on the fifteenth postoperative day. He was instructed to return to the outpatient dental clinic, where elastic bands were placed on the remaining anterior teeth that were to be extracted at a later date.

SECOND HOSPITAL ADMISSION—The patient was again admitted to the Barnes Hospital on March 15, 1953 for further extractions. The history during the intervening time was not significant. Laboratory findings were essentially the same as at the previous admission except for clotting time of 100 minutes. Preoperative orders were the same as on the first admission except for the addition of an antihistamine, which was administered as follows: 50 mg. given orally every four hours beginning the day of the operation and continuing for four days postoperatively. Nine posterior teeth were removed in one operation. Postsurgical hemorrhage was controlled as before, except that no splint was used and oxidized cellulose (Oxycel) and Monsel's solution were used exclusively. Bleeding had ceased entirely by the sixth postoperative day,

and the patient was discharged on the eighth postoperative day.

SUMMARY OF TREATMENT—A total of 19 teeth were removed in two surgical procedures. After the removal of ten teeth, postoperative hemorrhage continued for 12 days. After the removal of nine teeth, the patient bled for six days. The various factors which possibly influenced the more rapid healing during the second admission will be discussed later in the paper. Measures used to control postsurgical hemorrhage on the first admission were ice packs, thrombin, oxidized cellulose (Oxycel and Hemo-Pak), Monsel's solution, gauze pressure packs, dental compound, splints and daily transfusions. The only variation in treatment on the second admission was the addition of an antihistamine.

■ *Observations and Discussion*

In the past almost all discussions regarding the management of dental extractions for the hemophiliac have stressed the importance of having the patient in a hospital and of removing only one tooth at a time. Our work with hemophiliacs, however, has led us to the belief that, for the hospitalized patient, several teeth may be removed at one time, and that single-rooted teeth which have been adequately prepared with elastic bands can be removed in the dental office with relative impunity.

There seems to be no significant difference in the duration of postsurgical hemorrhage after the removal of one tooth as compared with hemorrhage after the removal of several teeth. Adjacent sockets seem to heal at a uniform rate, independent of one another, so that the total size of the injured tissue area bears no relation to the duration of hemorrhage. Of course, the increased number of injured vessels results in larger volume loss per unit of time, but the quantity of blood lost from five or six sockets could hardly cause rapid exsanguination. It follows also that when many teeth have to be removed, the patient can be spared needless extra expense and discomfort if several teeth can be extracted during each hospital admission.

For the hemophiliac, removal of teeth, when performed in the office rather than in the hospital, should be attempted only when prior arrangements can be made to have the patient admitted to a hospital on short notice, if necessary. In selected cases the unnecessary cost of hospitalization almost certainly can be avoided for the removal of some teeth, but hospital facilities must be available if required.

The most difficult problem posed when teeth are extracted in an office is the decision as to when the tooth has been as completely exfoliated as possible by the rubber bands. Since the bands do not register on a roentgenogram, the surgeon must depend on his evaluation of the degree of looseness of the tooth and on the amount of movement out of its normal position in the alveolus. If the tooth is not removed too early, the oral epithelium will have sealed off almost all the tissues which might bleed, leaving as the only area of attached tissues that which finally occupied the inside of the first rubber band. Of course, the tissue which remains attached to the apex of the root (because it is inside the lumen of the relaxed elastic

band) is always a potential area for hemorrhage. Thus the smallest possible bands should be used in exfoliating teeth, since the smaller the lumen the less tissue will remain to bleed. The final solution of the problem may be at hand when an elastic band material is obtainable which has almost no inside diameter when relaxed, yet is capable of being stretched over the crown of a tooth.

Archer[4] and others apparently believe that the use of elastic bands creates an additional hazard, since they may cause an area of inflammation about the teeth and thus result in greater bleeding after tooth removal. Archer refers to the fact that in his cases spontaneous postoperative hemorrhages occurred from the gingival margins when rubber bands had been used preoperatively, and indicates that the amount of bleeding seemed to have been greater because they were used. We have noticed the same type of bleeding after the removal of many teeth which had no bands applied, and feel that the bands should not add to the risk involved if left in place long enough to permit the initial inflammatory reaction to subside and epithelization of the detached periradicular tissues to take place. In the cases reported herein, rubber bands were employed prior to extraction on 14 single-rooted teeth and ten single-rooted teeth were extracted without prior use of elastics. The extraction of the teeth that were not treated with elastics was followed by seven to ten days of hemorrhage, while none of the extraction sites of the teeth on which elastics had been used bled for more than 48 hours. If the group of 29 posterior teeth removed with forceps were included in the number of teeth not treated with elastics, the difference in duration of postoperative hemorrhage would be even more apparent. The work of Quick[1] may hold part of the answer to the question of why rubber bands seem to be so helpful in reducing the quantity and duration of postextraction hemorrhage. According to Quick, nearly all bleeding in hemophilia comes from minute arterial vessels, and small cuts which involve only capillaries rarely bleed for any abnormal length of time. Injured capillaries, Quick states, apparently are closed by an inherent contracting force and by the natural adhesive properties of damaged endothelium, which is not impaired in hemophilia. Thus any measures which succeed in reducing the number of injured arterial vessels should result in less bleeding postoperatively.

In view of the minimal (perhaps a total of 0.5 cc.) amount of bleeding which followed the extraction of the tooth which had been prepared with elastic bands in Case 1, we decided to attempt several extractions by that method for Case 3. In doing so, several observations were made. Since the crowns were entirely gone from five of the seven teeth which were to be removed with elastics, the epithelial attachments were intentionally broken to permit placement of the first bands while the patient was still hospitalized. The tissues surgically involved continued to bleed slightly for three to five days, but never caused enough volume loss to be significant or bothersome to the patient. After the patient was discharged from the hospital he returned to the dental clinic

4. Archer, W. H., and Zubrow, H. J. Hemophiliac: the pre- and post-operative treatment; case report. Oral Surg., Oral Med. & Oral Path. 3:1377 Nov. 1950.

as an outpatient twice a week for the addition of more elastic bands. The original intent had been to try to exfoliate the seven anterior teeth at one time, but we found that simultaneously placing bands on all the teeth resulted in too much crowding, so that none of the bands were moving up as we felt they should. All the bands were then removed from every other tooth and the situation improved. Six weeks after the first rubber bands were placed on the teeth, one tooth was sufficiently exfoliated so that it was possible to extract it without hospitalizing the patient. After removal of the tooth, the socket bled a few drops over a 24 hour period and then the bleeding ceased entirely.

As indicated by the case reports, there seemed to be little difference in the effectiveness of the three types of absorbable hemostatic substances, Gelfoam, Oxycel and Hemo-Pak, as they were used in treating postsurgical hemorrhage. In considering the cases as a group, however, the best results were obtained with Oxycel. Gelfoam for this particular use seemed to have a tendency to dissolve and be pushed away from contact with the bleeding surfaces by the flow of blood. Hemo-Pak seemed to disintegrate too rapidly, ending as a soft, gelatinous mass which was difficult to handle.

The value of various local hemostatic substances varies with the individual case. Topical thrombin is the most nearly physiologic substance available, but is of little value in some cases. For Cases 1, 2 and 3, topical thrombin seemed to be efficacious in temporarily arresting hemorrhage. In Case 4, however, it was not nearly as satisfactory, since hemorrhage resumed unabated within minutes after it was applied; therefore, Monsel's solution was tried and it proved to be far more helpful.

Within a few hours after Case 3 had received his third daily transfusion of 500 cc. of fresh whole blood, he developed a severe nosebleed and his right knee began to increase in size. The hematologist in attendance felt that although the hematoma of the knee and the nosebleed might have been merely coincidental, there also was a good possibility that, since the patient had not been losing blood, they might have been initiated by the increased volume of circulating blood brought about by the recent transfusions. It was decided, therefore, that in future the daily transfusions would consist of 250 cc. of plasma rather than 500 cc. of whole blood. Since the plasma contains all but a very small percentage of the thromboplastinogen present in whole blood, it follows that whole blood is not necessary to make the transfusions effective in arresting hemorrhage. Also, small quantities seem to be as effective in providing as much utilizable thromboplastinogen as are even much larger quantities, so that one transfusion of 250 cc. in 24 hours usually is adequate to control bleeding. Many authors, including White and Mallett,[5] have stressed the value of Cohn's so-called "Fraction I" of plasma, which apparently is a concentrated source of the antihemophilia factors of blood. At present it is difficult to secure, so until it becomes more available, fresh plasma probably will remain the most important blood substitute.

The use of sutures in an attempt to

5. White, P. H., and Mallett, S. P. Management of hemophilia in dental extractions. J. Oral Surg. 7:237 July 1949.

prevent displacement of alveolar soft tissues has been futile in our hands, and many authors report similar results. Within three to four days the alveolar tissues in every case developed a soft, spongy, mushy character in which the sutures were lying loose, merely interfering with the changing of dressings. As Peterson[6] has pointed out, one of the common observations made by those who have removed teeth for hemophiliacs is that within a few days after extraction the alveolar tissues begin to look their worst. They seem to be oozing from every point possible, they become dark in color, the gingival tissues move away from the underlying bone and have the consistency of wet tissue paper. This discouraging state is routinely maintained for a few days, and then the tissues change suddenly into firm, pink mucosa, which also soon stops bleeding. The transition signals the beginning of the end of that particular siege of hemorrhage.

Another point which has been stressed by many authors, and one with which we must disagree, concerns the importance of delaying all surgery until the clotting time has been brought within normal limits by means of transfusions. We have found that in none of the cases was the clotting time ever brought below 18 minutes, even though transfusions had been administered for many days; yet in every instance the hemorrhage ceased in a period of time that was average for each individual hemophiliac. In other words, the length of time required for clotting, measured at any point in the course of therapy, had no apparent bearing on the duration of postoperative hemorrhage. It appeared that each hemophiliac had a certain average number of days during which he would continue to bleed. If transfusions could bring the clotting time within normal limits—which is questionable—and maintain it there for a matter of days, then there should be no reason why hemorrhage would resume if the transfusions were discontinued. The surgeon can minimize the quantity of blood lost daily by means of hemostatic gauzes, styptics, cold, pressure and transfusions, but complete cessation of bleeding depends on the eventual epithelization of the surfaces of the injured tissue.

Pressure seems to be of value in the temporary control of hemorrhage for the hemophiliac, although the injudicious application of pressure can defeat its purpose if the surrounding tissue is unduly traumatized. If an acrylic splint, for instance, is not well adapted and the gingival tissue is forced away from the necks of adjacent teeth or from alveolar bone, another source of hemorrhage may be initiated, thus complicating the problem. Acrylic splints seemed to be of help in controlling hemorrhage for Case 2, and the simpler compound splints were apparently of value in Case 3. In Case 4, compound splints merely seemed to aggravate the bleeding tendency, so that simple gauze packs were utilized with success, as in Case 1.

When multiple extractions are contemplated for the hemophiliac, an effective way to apply pressure to the extraction sites is to extract every other tooth as the first procedure. Small, half-inch gauze rolls can be wedged in between the remaining teeth over the bleeding sockets.

6. Peterson, L. W. Personal communication, June 1953.

These may be saturated with a local hemostatic agent such as topical thrombin or Monsel's solution. The patient then can bite on one large central pack, placed so as to apply gentle pressure on all the smaller gauze rolls. This makes a stable arrangement and provides pressure which is sufficient to bring about periods of temporary hemostasis of varying length. Again, care must be taken so as not to apply excessive pressure on the gingival tissues around the necks of the remaining teeth, for this tissue probably will become soft and spongy and bleed freely on slight trauma, more so than normal gingival tissues.

Since physical and mental rest play an important part in the treatment of the hemophiliac, keeping the mouth clean is important in the maintenance of the patient's morale. After two or three days, all the oral structures become coated with stringy blood and debris unless special care is exercised. By instructing the patient in the careful use of an aspirator, he can do much himself to keep his mouth clean. Also, Caroid solution, an enzymatic ferment, used once or twice a day as a mouth wash, gives considerable relief. This seems to liquefy oral mucin and dissolve organic debris, thus aiding in the mechanical cleansing of the mouth.

If it is at all possible, the intraoral pressure packs should be designed so that the patient may, without too much effort, bring his lips together when he closes his mouth. This eliminates mouth breathing with its subsequent drying of the oral tissues, and the tissues retain more of their normal tonus and proper physiology.

If the patient is debilitated, supportive therapy, including the use of multiple vitamins and other antianemic substances such as iron compounds, may be indicated in preoperative preparation for surgery. These measures, however, are directed only toward the establishment of normal nutritional physiology and are not to be considered as directly influencing the clotting mechanism, which, in the hemophiliac, must be bolstered. The only forms of therapy that are effective in controlling hemorrhage for these patients are daily transfusions of blood substances from normal donors to provide antihemophilic factors, and local mechanical aids to provide temporary hemostasis during the time required for the tissues to heal themselves. The mechanical aids of greatest value include the absorbable cellulose preparations (Gelfoam, Hemo-Pak, Oxycel), topical thrombin, and Monsel's solution of ferric subsulfate. The successful use of such substances as viper venom, Ceanothyn, ovarian extract, fresh raw meat, and so forth, has been reported, but we have not felt it was necessary or have not had the opportunity to make use of them.

Another variable lies in the administration of antihistamines as was done for Case 4. This form of therapy was given for a two-fold purpose: (1) to combat the type of sensitivity reactions which followed the transfusions given during the first admission, and (2) to facilitate a more rapid tissue repair. These drugs were effective in aborting transfusion reactions during the second admission, since all transfusions were accomplished without incident. As to rapidity of tissue repair, it is still too early to draw any conclusions concerning the influence of antihistamine therapy on tissue healing, although much experimental work is being done in this

field. The following observations were made, however: There was no pain during the second convalescence, no postoperative swelling, and all sockets were completely epithelized on the seventh postoperative day as compared with the twelfth postoperative day following the extractions done during the first admission.

Choice of anesthesia is one of the many problems which arises when teeth are to be extracted for the hemophiliac. Local deep block anesthesia is theoretically undesirable, particularly for mandibular extractions, because of the possibility of serious and even fatal hematoma resulting from damaged mandibular vessels. There are reports in the literature of cases in which such complications have occurred. The usual nasotracheal intubation used for hospital oral surgery carries with it the possibility of initiating intranasal or pharyngeal hemorrhage incident to the insertion of the tube itself. Consequently, it would seem that in oral surgery for the hospitalized hemophiliac, a modified technic of administering general anesthesia should be considered, if and when local infiltration anesthesia is inadequate. This might take the form of the thiopental sodium, nitrous oxide, trichlorethylene sequence which is used in oral surgery office procedures without endotracheal intubation. In such cases, of course, proper placement of gauze mouth packs to provide for the maintenance of an adequate airway and control of secretions becomes of the utmost importance, since nasal tubes of any sort are contraindicated and oral airways are impractical. With the advent of the more potent local anesthetic agents, however, satisfactory anesthesia even of the majority of mandibular molars usually can be obtained by infiltration rather than by deep block injections.

■ *Summary*

Recent information concerning the pathology of hemophilia has been outlined, and the dental management of the disease discussed. Four case reports are presented, in which the methods used to extract a total of 53 teeth are appraised. The various measures which are available for the control of postsurgical hemorrhage are evaluated.—2723 *Central Avenue.*

■ THE GENESIS OF WISDOM AND GENIUS

Wisdom is the power of seeing things as they really are, and of counseling men to choose those actions which increase the total of peace and justice and charity in the world. Genius is the quality of the special spirit, whether in poetry or politics or science, which raises a man above a single locality or nation to influence the people of the world. To wisdom or genius we can assign no price that any purse can pay. Nor can we devise any curriculum guaranteed to produce them. All we know is that they are likely to arise in an atmosphere where thought and learning are held in honor.—*Cornelis W. de Kiewiet, "Education for Survival," The Scientific Monthly 76:61 February 1953.*

Salivary calculi

■ *John G. Whinery, D.D.S., Amarillo, Texas*

The most common disease of the salivary glands which comes to the attention of the dentist is the formation of salivary calculi. The patient may complain of the swelling of an obstructed gland. This swelling may be thought to be due to dental disease, and the association of swelling with the chewing of food also may cause the patient to seek his dentist. Asymptomatic calculi may be found on routine roentgenographic examination. These calcareous deposits are also referred to as stones and concrements.

The calculi are formed within the salivary glands and may move into the saliva ducts to result in either a partial or complete obstruction. If the free flow of saliva is blocked, swelling will occur in the region of the affected gland. If the duct is only partially obstructed, the swelling is transient, occurring only at mealtimes or on stimulation to salivation. Complete obstruction, on the other hand, results in a continually swollen gland with more severe pain. The amount of inflammatory reaction in the gland is in proportion to the degree of obstruction and the duration of the obstruction. Diagnosis nearly always may be established on the basis of the patient's history of swelling. If infection has developed concurrently or subsequent to the obstruction, however, the picture may be confused. An early case of unilateral mumps affecting the submaxillary gland must be eliminated by a differential diagnosis, and of course the possibility of a neoplasm must be considered.

While the diagnosis of obstruction of the flow of saliva usually is easily established from the history, the location of the obstruction is not always so easily determined. Bimanual palpation of the ducts may reveal the stone if it is of sufficient size to feel and if there is not too much inflammation in the adjacent tissues. The ducts always should be palpated from behind, forward. This may milk the stone out, and will prevent pushing the stone posteriorly into a surgically inaccessible position.

Roentgenograms, if taken at the correct angles and exposure, will reveal the location of the calculi. The proportion of organic and inorganic content of the concrements varies considerably, and some obstructing bodies may be practically radiolucent (Fig. 1). Care must be taken, therefore, to avoid overexposure and superimposition of the calculi on adjacent bone (Fig. 2). It is exceedingly important that the roentgenographic examination always include a variety of angles or projections, since there are commonly multiple calculi, all of which may not be visible on any one projection (Fig. 3). The submaxillary gland with its duct requires three views: (1) a true lateral view of the mandible with the tongue depressed by the fingers (Fig. 2); (2) an occlusal view with the central ray perpendicular to

a film laid on the biting surfaces of the lower teeth (Fig. 4), and (3) a modified occlusal view with the ray projected from obliquely behind and beneath the angle of the mandible (Fig. 5). The patient must extend his neck and turn his head to permit this view, which shows the posterior third of Wharton's duct and the submaxillary gland. It is the submaxillary gland which is obstructed most frequently.

The parotid gland is rarely afflicted with concrements; mucous plugs more frequently cause obstruction of this gland. Two projections which will reveal radiopaque objects in the gland or its duct may be used as follows: (1) a small dental x-ray film may be placed in the buccal vestibule, just ahead of the anterior border of the ramus. The central ray is directed through the cheek at right angles to the film or from a slightly posterior position. (2) A film may be placed just behind the gland with its vertical edge pressed in ahead of the ear and behind the jaw. The central ray then should be directed from in front parallel to the flare of the jaw, at right angles to the film on the level of Stenson's duct.

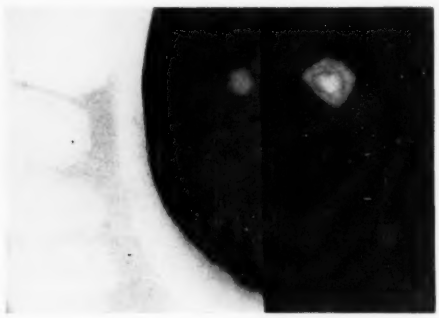


Fig. 1—Radiolucency of concrement. Left: In situ. Right: Same concrement excised and on x-ray film

The salivary concrements for the most part are phosphatic. Apparently they form around a central nidus of desquamated epithelial cells, bacteria, or some foreign material. They vary greatly in shape, size and number. A small smooth-surfaced stone may obstruct a duct more completely than will a large irregularly shaped calculus (Fig. 6, right). Multiple calculi in the same salivary gland and duct are common (Fig. 6, left).

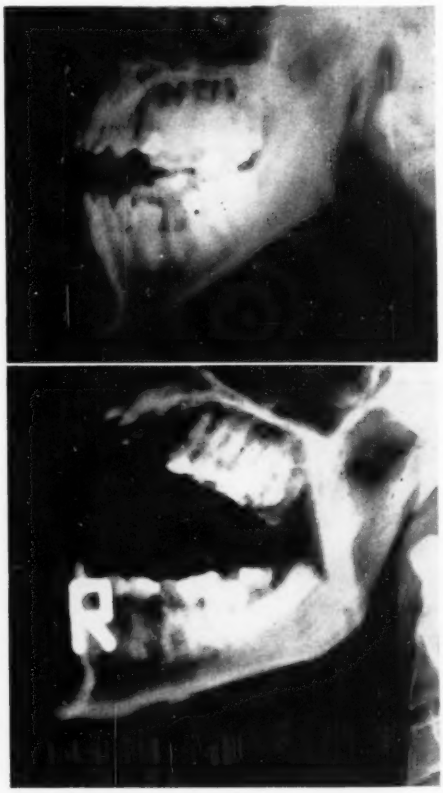


Fig. 2—Lateral roentgenogram demonstrating technic of depression of the tongue with the fingers to remove calculi from superimposition on the mandible

Obstructing calculi should be removed as soon as possible, provided induration of adjacent tissues does not prevent accurate palpation of the stone. Cellulitis may develop as bacteria gain entrance to the duct, the gland and adjacent tissue when the flow of saliva through the duct ceases. One case of submaxillary duct obstruction has been observed in which Ludwig's angina developed as a complication. Antibiotic therapy and frequent hot mouth washes will reduce the induration and greatly increase the chances for successful removal of the stone. In cases where severe infection is present, it may be necessary to incise for drainage. If a sublingual abscess is present, pus must be drained. With acute retention where the obstructing stones may not be palpated, an attempt may be made to incise the duct posterior to the stone in order to drain the saliva. As the pressure increases within the gland from the blocked flow of saliva, the gland suffers more and more injury. A permanent dysfunction of the gland may result from repeated and prolonged exposure to this pressure.

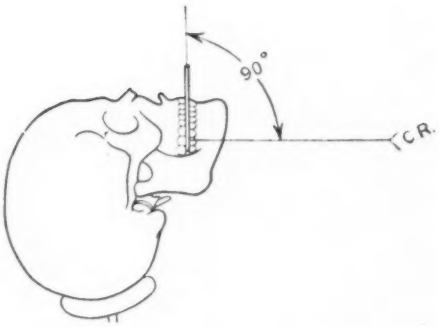


Fig. 4—Technic of "regular" occlusal roentgenogram

Small and soft salivary calculi may pass spontaneously or be milked out of the duct. The patient may experience the sensation of finding "sand" in his mouth.

Surgical removal of the stones probably should be attempted intraorally in all instances. If this conservative approach fails, the gland then can be removed. For the more frequently encountered submaxillary concrements, two surgical technics usually are successful. If the stone can be palpated easily, it may be held against the side of the mandible with the index finger. When thus localized, an incision is made directly over the stone. The stone must be lifted out with care so as not to crush it and leave a centrum for a new concrement. This procedure is practicable only if the stone is in the anterior two thirds of the duct.

If the stones are small, multiple, or in the posterior third of the duct, a probe may be used to guide the surgeon to the stones. A fine metal probe is passed care-

Fig. 3—Left: Occlusal roentgenogram demonstrating posterior limitation to the regular occlusal view. Right: Modified occlusal roentgenogram of same patient demonstrating additional posterior stone

Fig. 5—Left: Technic of "modified" occlusal roentgenogram. Right: Central ray is projected from behind and beneath the mandibular angle

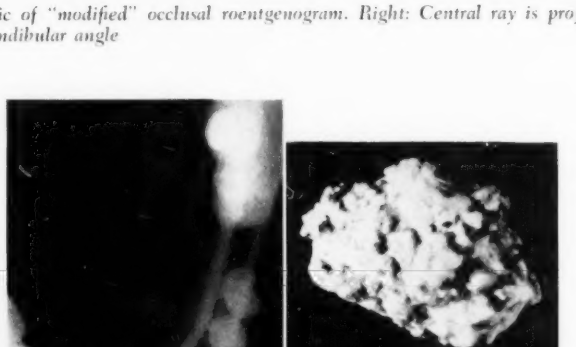


Fig. 6—Left: Two calculi of ordinary but dissimilar size. Right: Irregular surface of 1 cm. stone

fully into the duct as far back as necessary. Care must be taken to avoid pushing the stone posteriorly. To prevent this displacement, a double suture may be tied around the duct posterior to the concrements. It should be remembered that the duct turns

slightly laterally at the posterior edge of the mylohyoid muscle. The floor of the mouth is then incised along the probe in order to lay open the Stenson's duct. Care must be taken that the lingual nerve is not severed. It will not be severed if the dissection is carried only to the level of the probe; however, it is advisable to tell the patient of this possibility before the operation. The stones, when freed of the duct, will float out on a flow of saliva or they may be lifted out carefully.

After excision of the stones, no sutures are placed. The saliva is allowed to find its way into the mouth through the incision. The entire duct may heal even without any attempted closure of the incision to re-establish the normal aperture. Stenosis of the duct seldom results from scarring and may be overcome by dilating and by teaching the patient to milk the gland.

Normal function usually returns even to suppurating glands within a week after removal of the obstruction. Perhaps a third of the glands again become obstructed by new concrements. This may occur within a few months or in several years. It is well to excise the gland if recurrence of obstruction is frequent.

Fig. 7—Large submaxillary concrement within gland of 75 year old man. This stone has a known duration of 20 years

Fig. 8—Large stone photographed beside roentgenogram of same stone. This demonstrates the capacity of duct to dilate

Routine roentgenographic examination occasionally will reveal asymptomatic salivary concrements (Fig. 7). Most of these will lie within the structure of the glands. They may become very large and still cause no obstruction. They should, of course, be left alone until symptoms develop. It has been noted that the duct has the ability to dilate (Fig. 8).

The youngest patient with a salivary concrement observed by the author was a girl 16 years old. More commonly they develop when the individual is between the third and sixth decade. No predilection for either sex has been observed. The author has observed a number of patients with recurrent salivary calculi who also had known renal or biliary concrements. Bilateral salivary concrements were present in several of these cases.—*Fisk M and P Building.*

Cysts of the incisive canal with concrements

■ *Stanley A. Lovestedt, D.D.S., and Karl W. Bruce, D.D.S., Rochester, Minn.*

Cysts of the incisive canal are no longer considered rare, but such a cyst which contains a stone is worthy of note because it is encountered so infrequently. This infrequency may be explained by the few roentgenographic examinations of the entire mouth made in the practice of dentistry and also by failure to recognize the concrements for what they are.

■ *Roentgenographic Identification*

The identification of intraluminal stones in the incisive region usually is dependent on roentgenographic evidence. The use of occlusal and periapical roentgenograms and various tube angulations (Fig. 1) and knowledge of the anatomy of the region are of help in the diagnosis, for it is necessary in some instances to distinguish stones from retained root tips (Fig. 2), the anterior nasal spine, and areas of increased density in the region of the incisive canal where a cyst may be located. In other instances, the stone may be superimposed over the junction of the hard palate and the nasal septum and diagnosis is then difficult. A series of roentgenograms, covering a period of several years, often is one of the greatest helps in studying concrements (Fig. 3).

The rate of stone formation in a period of four years is shown in Figure 4. In Figure 5, roentgenograms made in a similar period of four years are shown. The stone in this case was formed in 15 months, remained relatively constant for two years and then was sloughed.

■ *Incidence*

Stones undoubtedly develop at various ages; however, those in this study occurred in adults. In addition to the six cases illustrated in Figures 1 to 6, four others have been encountered in which roentgenographic evidence of calcification was associated with cysts in the incisive canal. These cases have been collected over several years. In an attempt to study the incidence of concrements in cysts of this region, roentgenograms in 500 additional cases of incisive canal cysts were reviewed. None showed any evidence of stones being present.

■ *Report of Case*

A white woman, 43 years of age, was seen in the Section of Dentistry of the Mayo Clinic. She had a history of inability to wear her maxillary denture because of persistent burning in the region of the palatine papilla. The patient said that the maxilla had been edentulous for 31 years, and that she had had a maxillary full denture constructed two years before admission. The denture had caused a con-

From the Section of Dentistry, Mayo Clinic.

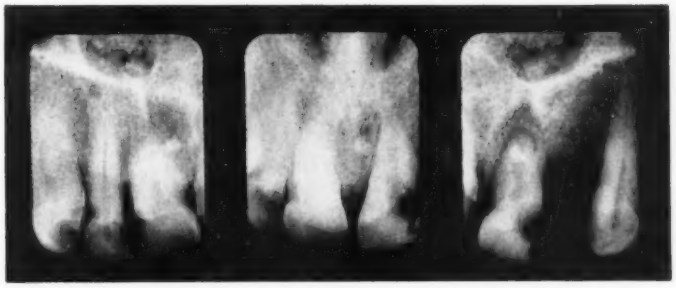


Fig. 1—Use of various tube angulations for identification of the concrements in maxillary region; intraoral views

stant burning since its insertion. This sensation was especially pronounced in the region of the palatine (incisive) papilla. There was no dysphagia or burning of the tongue. The patient was not wearing a mandibular partial denture. Complete dental roentgenograms revealed a cyst in the incisive canal which appeared to contain two radiopaque bodies (stones or concrements) within its lumen (Fig. 6).

The patient was advised that the cyst in the incisive canal should be enucleated and also that a mandibular partial denture should be constructed to distribute the occlusal load more uniformly over both arches.

OPERATION—Under local anesthesia, an incision was made along the alveolar crest of the edentulous maxillary ridge extending from the bicuspid region on the left to the bicuspid region on the right. The mucoperiosteum was retracted palatally and in so doing, it was noted that the cyst was attached to the palatine (incisive) papilla. This attachment was freed, the mucoperiosteum was retracted further which gave a better view of the incisive canal cyst. The cyst was freed from the bony cavity by blunt dissection and then removed, leaving a well-defined and smooth-walled bony cavity. Sulfathiazole and penicillin powder were insufflated into the wound and the wound was closed.

PATHOLOGIC FINDINGS—The cyst contained two greenish black stones (Fig. 7), one of which measured 4 by 3 mm., the other 2 by 2 mm. The stones appeared to be medium hard to soft, and somewhat brittle when fracture was attempted. They were homogeneous and contained no tooth substance. No laminations were present.

Fig. 2—The concrement easily could be confused with a cementoma or area of atypical apical hypercementosis

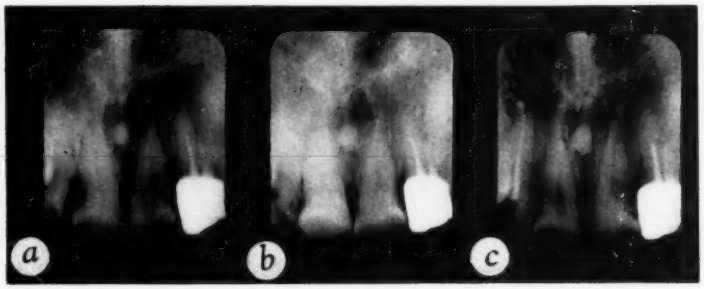


Fig. 3—Gradual increase in size of a stone from 1945 to 1948. Only evidence of stone was roentgenographic, as it caused no symptoms in the period covered. a: July 17, 1945. b: August 5, 1947. c: August 3, 1948

The cyst wall was lined with remnants of stratified squamous epithelium. The bulk of the cyst wall was composed of a thick layer of fibrous connective tissue which showed evidence of inflammation and some hemorrhage.

One of the stones was tested for cholesterol in the biochemical laboratory and was found to contain a trace.

POSTOPERATIVE COURSE—The postoperative reaction was minimal. Postoperative roentgenograms were made, and the patient was dismissed from the hospital on the second postoperative day. The roentgenograms were satisfactory (Fig. 6, b).

■ *Comment*

Cysts of the incisive canal are cysts of nondental origin originating from epithelial remnants which persist in the anterior palatine canal. Most of them are lined with squamous epithelium but they may be lined with ciliated columnar or cuboidal epithelium. They may occur as a single cyst either in a common canal or in a major lateral canal (Stensen). Two cysts may occur in which case they develop independently of one another in each of the major lateral canals.

Meyer,[1] in 1914, first noted cysts in the midline of the maxilla and in 1931[2] he reported on a more extensive study. Others who have contributed to the knowledge of median anterior maxillary cysts (nasopalatine) are Kronfeld,[3] Schroff,[4, 5] Rushton,[6] Wild,[7] Grohs,[8] Stafne, Austin and Gardner,[9] Bauer[10] and Silva.[11] Noyes[12] and Burket[13] also have

1. Meyer, A. W. A unique supernumerary paranasal sinus directly above the superior incisors. Spolia anatomica. J. Anat. & Physiol. 48:118 Jan. 1914.

2. Meyer, A. W. Median anterior maxillary cysts. J.A.D.A. 18:1851 Oct. 1931.

3. Kronfeld, Rudolf. Histopathology of the teeth and their surrounding structures. Philadelphia, Lea & Febiger, 1933, p. 425.

4. Schroff, Joseph. Unusual cysts of the maxilla. D. Items Interest 51:107 Feb. 1929.

5. Schroff, Joseph. Cysts in the incisor canal. J. D. Res. 10:739 Dec. 1930.

6. Rushton, M. A. A cyst in the median palatine suture. Brit. D. J. 51:109 Feb. 1930.

7. Wild, H. A. P. Comment on cysts in the region of the nasopalatine duct. D. Items Interest 52:63 Jan. 1930.

8. Grohs, Richard. Epithelial rests in region of palatinal papilla of upper jaw. (Abst.) J. D. Res. 14:187 June 1934.

9. Stafne, E. C.; Austin, L. T., and Gardner, B. S. Median anterior maxillary cysts. J.A.D.A. 23:801 May 1936.

10. Thoma, K. H. Oral pathology: a histological, roentgenological, and clinical study of the diseases of the teeth, jaws and mouth, ed. 3. St. Louis, C. V. Mosby Co., 1950, p. 952.

11. Silva, C. A. Facial cleft or fissural cysts. Am. J. Orthodont. & Oral Surg. 24:801 Aug. 1938.

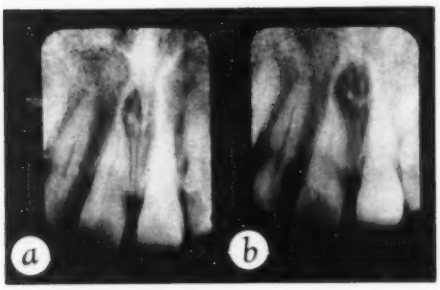


Fig. 4—Increase in density is probably greater than actual increase in size. a: March 11, 1944. b: January 30, 1948

added materially to knowledge of the anatomy and histopathology of the cysts of the incisive canal.

Cysts of the incisive canal are relatively common. In a series of adult patients in which he studied the roentgenograms, Meyer found definite roentgenographic evidence of a cyst in the incisive canal in one out of every 88 cases.[2] Stafne and associates[9] reported that the incidence of cysts of the incisive canal, as determined by a study of roentgenograms at the Mayo Clinic, was in no instance less than one in every 100 cases studied.

As mentioned earlier, concrements in cysts of the incisive canal are exceedingly rare. Thoma[14] described an instance, discovered at necropsy, of a small cyst of the incisive canal that was filled with cholesterol crystals. It seems reasonable to assume that these crystals might fuse in time to form a single cholesterol stone or stones.

The cause of intraluminal concrements (stones) is conjectural and an explanation of their presence can only be postulated. It is known that the fluid contents of a cyst are composed of plasma fluid, plasma protein, erythrocytes, leukocytes, cholesterol crystals, salts, desquamated epithelial cells, tissue debris from

12. Noyes, H. J. Anatomy of frenum labii in new born infants. Angle Orthodont. 5:3 Jan. 1935.

13. Burket, L. W. Nasopalatine duct structures and peculiar bony pattern observed in anterior maxillary region. Arch. Path. 23:793 June 1937.

14. Thoma, K. H. Oral pathology: a histological, roentgenological, and clinical study of the diseases of the teeth, jaws and mouth, ed. 3. St. Louis, C. V. Mosby Co., 1950, p. 954-955.

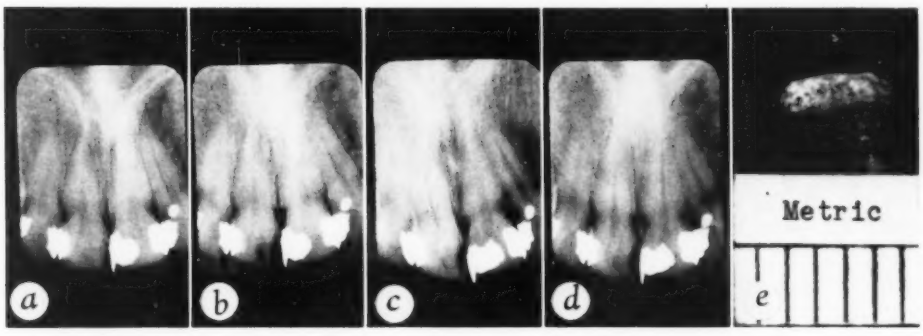


Fig. 5—Concrement. The region of the incisive papilla became sore and tender. a: December 12, 1948. b: February 3, 1950; subsequent sloughing of the stone. c: January 14, 1952. d: January 17, 1952. e: Sloughed stone (enlarged)

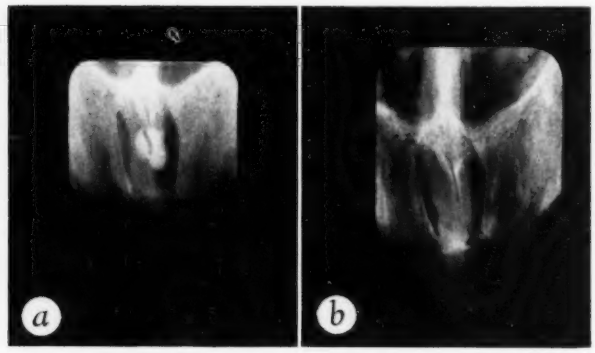


Fig. 6—Cyst and two stones contained therein. a: Before operation. b: Two days after operation

the cyst wall, pus, bacteria, and so forth. If a degree of parallelism of the etiology of gallstones can be seen between gallstones and stones (concrements) in cysts of the incisive canal, such factors as infection, stagnation and hypercholesterolemia must be considered.

Infection in a cyst wall will cause desquamation of the epithelial lining and also sloughing of the subepithelial fibrous connective tissue. The tissue debris that is sloughed into the lumen of the cyst is a potential nidus on which cholesterol or calcium salts can collect in view of the fact that the fluid contents of the cyst are more or less stagnant.

Another factor in the formation of concrements in cysts is hemorrhage from the cyst wall into the fluid contents, brought on by infection with subsequent eroding of small blood vessels. The fibrin of the blood plasma can be visualized to congeal (clot) and in this manner serve as a nidus for a concrement to be formed. Another possible explanation could be the breakdown of erythrocytes to blood pigments (that is, hemosiderin and hemofuscin) if the hemorrhage is large in amount or of a chronic (persistent) nature. This aggregation of blood pigment also may serve as a nidus on which further material (salts or cholesterol) may collect.

Hypercholesterolemia is considered a factor in the formation of gallstones by some and deemed negligible by others. Again, the fact that no parallelism has been established between formation of gallstones and that of intraluminal concrements in cysts must be emphasized. Hypercholesterolemia seems like a rational explanation for intraluminal stones in cysts. However, the concentration of cholesterol in the blood was not determined for any of our patients, and the laboratory found only a trace of cholesterol in the one stone analyzed. Obviously other contents were present but, because of its smallness, extensive analysis could not be made. It is possible that calcium salts are present because inflammatory exudate is rich in serum calcium and histopathologic study revealed inflammation in the wall of cysts removed from the incisive canal at operation.

■ *Summary*

Cysts of the incisive canal are of nondental origin and their etiology can be explained on the basis of persistent epithelial remnants in the anterior palatine canal. Cysts of the incisive canal are relatively common, but those containing concrements are rare. The problem of differential diagnosis is discussed and a case is reported to exemplify the occurrence of concrements in the lumen of a cyst of the incisive canal. The occurrence of concrements in a cyst of the incisive canal possibly may be explained on the basis of infection, stagnation and hypercholesterolemia.

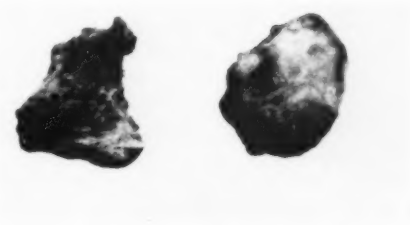


Fig. 7—Stones removed; rough and irregular surfaces should be noted. Picture enlarged

■ Selective Action of Antibiotics

Antibiotics possess certain peculiar properties which differentiate them sharply from ordinary antiseptics and disinfectants. . . . One of the most important properties of these agents is their selective action upon different cells, be they cells of microscopic forms of life or cells of higher organisms. By utilizing this selective action, one can obtain antibiotics that are able, without injuring the tissues of a higher organism, to affect the pathogenic organisms invading such tissues. This makes possible their therapeutic use.

Ehrlich was the first to recognize that the efficacy of a chemotherapeutic agent depends upon the difference in its toxicity to the parasite and to the host. He was carried too far afield by his side-chain theory, and did not recognize clearly, largely because of a lack of sufficient information at that time, that this important difference in the action of a chemical compound is due to the variation in effect that it exerts upon the metabolism of the parasite as compared to that of the host cells. The compounds that he used were too "toxic," since they exerted their lethal effects upon the invading organism and upon the patient in about equal degrees. The finding of Woods and Fildes in 1940 that the sulfonamides exert their effect upon bacterial growth by interfering with the normal metabolism of the bacteria was a marked step forward in our understanding of the mechanism of growth inhibition thus involved.—*Selman A. Waksman, "The Changing Concept in Microbiology," The Scientific Monthly 76:129 March 1953.*

Autotransplantation: *report of three cases*

■ *F. Pierce Noble, D.D.S., Texarkana, Arkansas-Texas*

Autotransplantation of unerupted third molars, when successful, offers a solution to the problem of satisfactorily replacing first permanent molars which frequently are lost in adolescence.

A review of recent literature indicates that Apfel[1] and Miller[2-4] have contributed most to the knowledge regarding transplantation of third molars.

CASE 1—A white girl, aged 14, came to the office on January 12, 1948 complaining of an abscessed lower right first permanent molar. The carious tooth was slightly sensitive to percussion. Roentgenograms indicated the presence of apical areas of rarefaction on both mesial and distal roots. Routine extraction was done under local anesthesia.

EXAMINATION—Approximately one month after the removal of the first molar, roentgenograms and clinical examination revealed that satisfactory healing had taken place. All remaining teeth were vital, oral hygiene was good and the gingival tissues were in excellent condition. The lower right unerupted third molar had progressed 2 mm. past the bifurcation stage of development and 6 mm. beyond the cementoenamel junction.

TREATMENT—On February 17, under mandibular block anesthesia and after premedication with secobarbital sodium and atropine, a long incision was begun about 1 cm. distal to the second molar. This incision was brought mesially along the crest of the ridge to the second molar then around the buccal gingival margin to a point slightly lingual to the crest of the ridge, then extended to the second bicuspid and around its buccal gingival margin to terminate at the distal side of the first bicuspid. By the use of chisels, large surgical burs, files and curets, the first molar region was prepared to receive the transplant. After removing the bone which was buccal and occlusal to the unerupted third molar, this tooth was carefully elevated and placed immediately into the enlarged first molar socket (Fig. 1, A). The buccal and lingual soft tissue flaps were approximated with multiple interrupted black silk sutures.

No postoperative chemotherapy or antibiotics were prescribed. Postoperative pain and edema were slight. Sutures were removed on the fourth day. After two months the roentgenograms indicated the presence of slight additional root formation (Fig. 1, B). In seven months' time the roots were about half the normal length (Fig. 1, C), clinical gingival attachment was good, and the tooth responded to vitality tests but its position was poor. The tooth was inclined mesially, and there was no contact between the mesial aspect of the transplant and the distal aspect of the second bicuspid.

1. Apfel, Harland. Autoplasty of enucleated prefunctional third molars. J. Oral Surg. 8:289 Oct. 1950.
2. Miller, H. M. Tooth transplantation. J. Oral Surg. 9:68 Jan. 1951.
3. Miller, H. M. Transplantation. J.A.D.A. 40:237 Feb. 1950.
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DISCUSSION—This transplant was clinically successful except for the position of the tooth in the dental arch and the length of the roots. The mesial inclination probably was caused by the original poor placement of the tooth. If the transplant had been placed in a good vertical position it probably would have erupted normally.

It was suggested that the patient begin orthodontic treatment to correct the mesial inclination of the transplant. So far the patient has not complied with the suggestion. The tooth is in the same position as previously.

CASE 2—On January 19, 1950 a girl, aged 14, came to the office with a nonvital, periapically diseased lower right first molar. The tooth was sensitive to percussion. Roentgenograms indicated a carious exposure of the pulp. Routine extraction was done under local anesthesia.

Three weeks after the removal of the abscessed first molar, clinical and roentgenographic examination indicated that apparently satisfactory healing had taken place (Fig. 2, A). The lower right unerupted third molar had developed roots 4 mm. past the bifurcation point and 6 mm. beyond the cementoenamel junction. Oral hygiene was poor, however, and there was evidence of gingival inflammation.

TREATMENT—On February 10, 1950, under mandibular block anesthesia, the lower right unerupted third molar was transplanted to the first molar socket. The operative procedure was essentially the same as was used in Case 1.

The immediate postoperative course was extremely unsatisfactory. Pain was intense for almost ten days, and there was a considerable amount of edema accompanied by mandibular trismus. Temperature was 103°F. All mandibular posterior teeth on the right side became loose and sensitive to percussion. After the third day pus could be expressed from the first molar socket region by a slight pressure on the buccal mucosa. Three hundred thousand units of procaine penicillin had been given intramuscularly

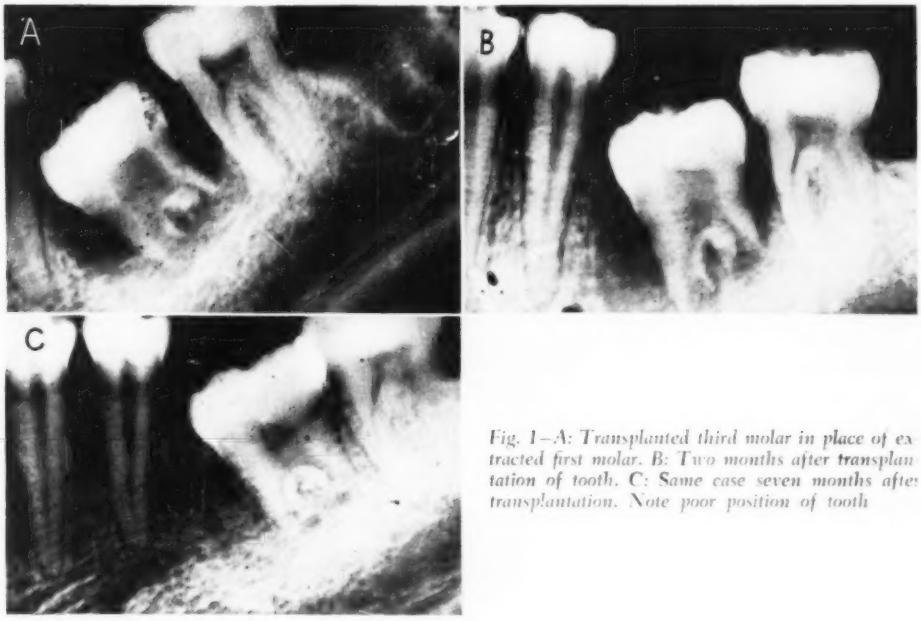


Fig. 1—A: Transplanted third molar in place of extracted first molar. B: Two months after transplantation of tooth. C: Same case seven months after transplantation. Note poor position of tooth

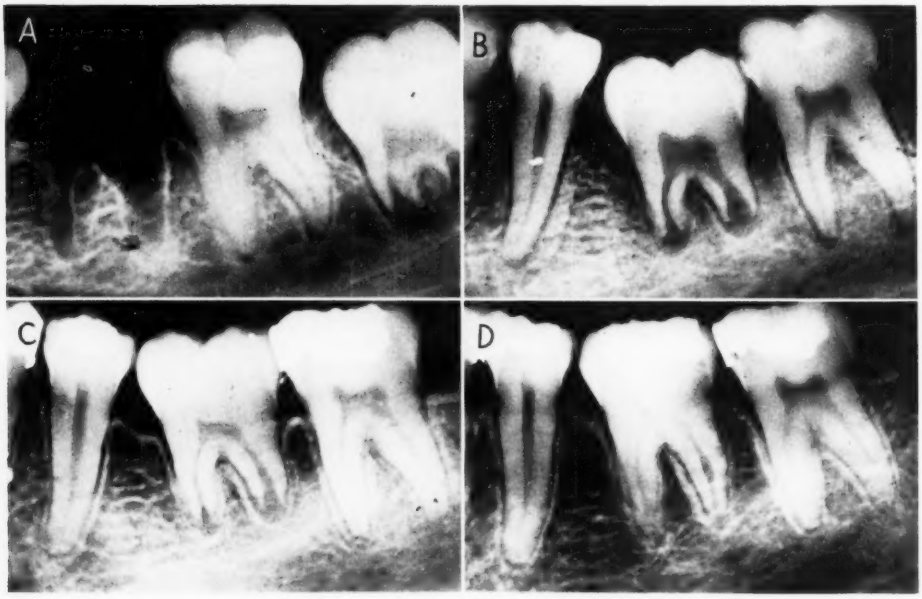


Fig. 2—A: Extraction wound healed, roots of third molar in development, birfurcation well-formed. B: Two and one-half months after transplantation of third molar into first molar socket. C: Ten months after transplantation. Root formation in progress. Pulp chamber and root canals considerably narrowed. D: Two and one-half years after transplantation. Note well-formed roots. Tooth in good functional position

one hour preoperatively and had been repeated daily for five days. Aureomycin, 2 Gm. daily, was then prescribed from the fifth to tenth postoperative days with spontaneous healing following.

In two and a half months new root development could be demonstrated roentgenographically (Fig. 2, B). In ten months the roots were well formed but the apexes were still open (Fig. 2, C). Vitality tests were positive, occlusion was good, and clinical gingival attachment was good. In two and a half years (Fig. 2, D) the roots, although shorter than the first molar roots, appeared to be almost completely formed. In spite of considerable narrowing of the pulp chamber and root canals, the tooth still responded readily to vitality tests.

DISCUSSION—The surprising factor in this case is that after such a severe postoperative infection the development of the transplanted tooth was normal in every respect.

CASE 3—On April 6, 1948 a boy, aged 15, came to the office with a nonvital and periapically diseased mandibular right first permanent molar. Roentgenograms indicated a carious exposure of the pulp and small apical radiolucent areas. The tooth was not sensitive to percussion. Extraction was done under local anesthesia.

Four weeks after the removal of the first molar, clinical and roentgenographic examination indicated that satisfactory healing had taken place. Oral hygiene was extremely poor, the gingival tissues were slightly inflamed and had a tendency to bleed easily. The lower right unerupted third molar had not reached the bifurcation stage of development. Root development had progressed only 2.5 mm. beyond the cementoenamel junction.

TREATMENT—On May 12, 1948, under mandibular block anesthesia, the lower right unerupted third molar was transplanted to the first molar socket (Fig. 3, A). The operative procedures were essentially the same as used in Cases 1 and 2. The only difference was that in Case 3 specific attention was paid to the problem of proper vertical positioning of the transplant.

No postoperative chemotherapy or antibiotics were prescribed. Postoperative pain and edema were negligible, and the sutures were removed on the third day. In three and one-half months roentgenograms indicated the presence of some irregular root formation (Fig. 3, B). In 29 months, roentgenograms revealed an extremely irregular root formation with bone growing into what should be the pulp chamber (Fig. 3, C). Gingival attachment and occlusion were good but the tooth did not respond to vitality tests.

MICROSCOPIC EXAMINATION—This transplanted tooth was removed, and microscopic examination undertaken. The microscopic view of the tooth (Fig. 4) corresponds to the roentgenographic picture. The mesial root is not formed; the distal root is present but appears short. The outline of regular dentin which was formed prior to transplantation is sharply separated from an irregular hard structure which was probably laid down after the operation. The short distal root consists of an irregular hard substance which becomes more regular toward the apex and in some sections (Fig. 5, left) consists of regular dentin. The apex is wide open; odontoblasts line the dentin, and the pulp tissue appears to be normal. Some

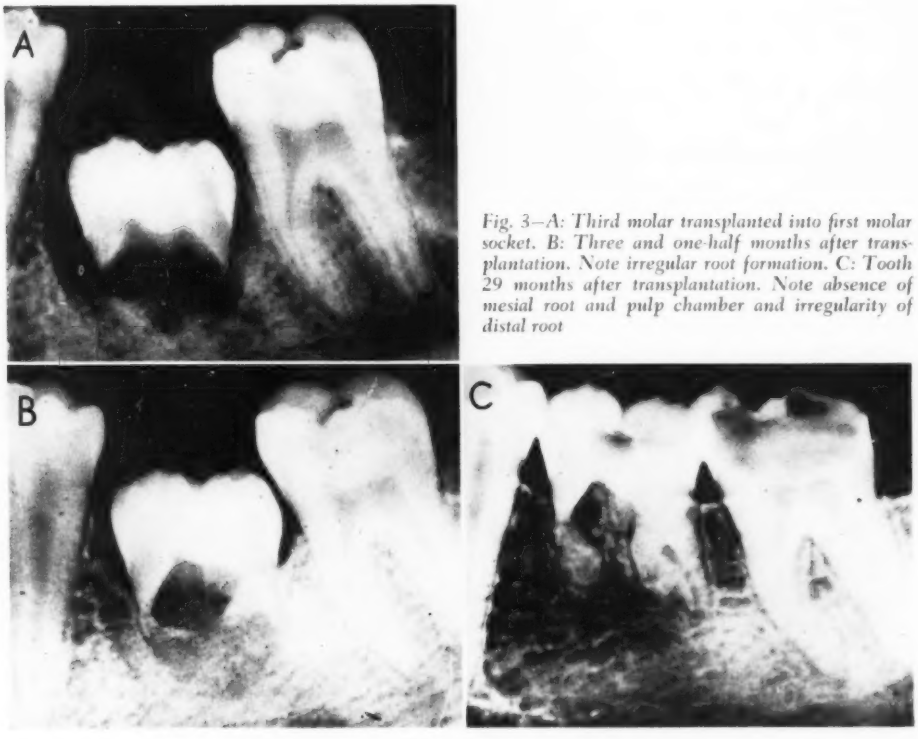


Fig. 3—A: Third molar transplanted into first molar socket. B: Three and one-half months after transplantation. Note irregular root formation. C: Tooth 29 months after transplantation. Note absence of mesial root and pulp chamber and irregularity of distal root

Fig. 4—Photomicrogram of transplanted third molar shown in Figure 3. This picture corresponds closely to that seen in the roentgenogram

remnants of Hertwig's epithelial root sheath are present at the apical end of the root. Higher toward the crown, the hard substance forming the root consists of dentin in some areas, in others, bone; and in some regions it is impossible to distinguish the character of the hard substance. One can only say that it is "dentinlike" (Fig. 5, center). As shown in Figure 5, center, a piece of dentin lies on one side against the original pulp chamber; on the other side it is covered by the newly-formed hard substance. Small dentin remnants are also seen in other areas. In the region of the mesial root, dentin formation stopped at the time of operation as is indicated by the sharp demarcation between regular dentin and newformed bonelike hard substance which now covers the former pulpal surface of the dentin.

DISCUSSION—From the microscopic findings, it is evident that the tooth sac was opened during the transplantation, and Hertwig's epithelial root sheath was injured. The injury was less severe on the distal root, and recovery occurred toward the end of the healing period.

Surgical interference such as extraction and transplantation of a developing tooth constitutes a very severe trauma. There is no question but that the prerequisite of a successful transplantation of such a tooth germ is the careful removal of the tooth in its connective tissue sac to avoid damage to the epithelial

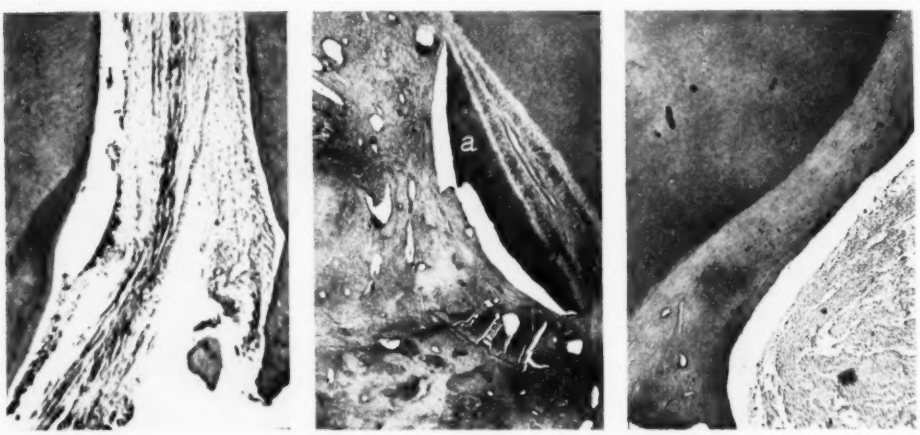


Fig. 5—Left: Apical area of distal root in a different section than that shown in Figure 4. Regular dentin formation by odontoblasts. Center: Dentinlike hard substance (a) in distal part of transplanted tooth. Right: Bone formation on surface of dentin in mesial portion of transplanted tooth

organ over the enamel as well as the root opening, the so-called Hertwig's epithelial root sheath. If the coronal epithelium—the reduced enamel epithelium—is injured, resorption of the enamel, ankylosis and impaction might follow. If the Hertwig's epithelial sheath is injured, dentin formation stops, and the root cannot develop.

One has to assume that the pulp which exists at the time of extraction is damaged by severance of the blood supply and that this pulp has to become reorganized by invading connective tissue elements in the same way that a blood clot becomes organized. The pulp chamber probably becomes obliterated by an undifferentiated hard substance. The epithelium can survive the operation because it has no blood supply of its own, and when transplanted into a pool of blood it will find ample nutrition during the time that organization goes on. Later it seemingly recovers its function and stimulates the connective tissue to the formation of odontoblasts and regular dentin.

The crucial question in the achievement of success in transplantation seems to be the discrepancy between speed of eruption, speed of root formation and speed of bone formation at the apex. Bone formation follows eruption closely, but root formation is a rather slow process. This disharmony in the speed of eruption and bone formation on one side and root dentin formation on the other may lead to the development of short roots, as has been observed in some transplanted teeth.

CONCLUSION—From the experience with the three autogenous transplantations described, it might be concluded that better results are obtained when the unerupted third molar has at least reached the bifurcation stage of development. Also it might be inferred that the transplant should be placed in a good vertical position if it is to erupt into normal occlusion and alignment. In Case 2 infection apparently had no deleterious effect on either the root development or the vitality of the tooth. The results of the histological examination in Case 3 indicate that perhaps the most important precaution to take is to avoid injuring the connective tissue sac which protects the epithelial tissues covering the enamel as well as the epithelial root sheath.—332 *East Fifth Street.*

Fibrous dysplasia of the mandible: *report of case*

■ *Barkley S. Wyckoff, D.D.S., Santa Barbara, Calif.*

A boy, 15 years old, was struck on the right side of the mandible with a baseball about three weeks before admission to the County Hospital Clinic. The patient and the parents stated there was no swelling of the jaw or face before admission. There was no history of pain before the injury. The facial asymmetry prompted consultation.

He was a well developed Spanish boy, with a slight swelling of the body of the right side of the mandible. There was an elevated nevus (congenital) on the skin over the midportion of the lower jaw on the right side which measured 6 by 6 mm. Two smaller flat, pigmented nevi were present on the right side of the body, one over the middle third of the

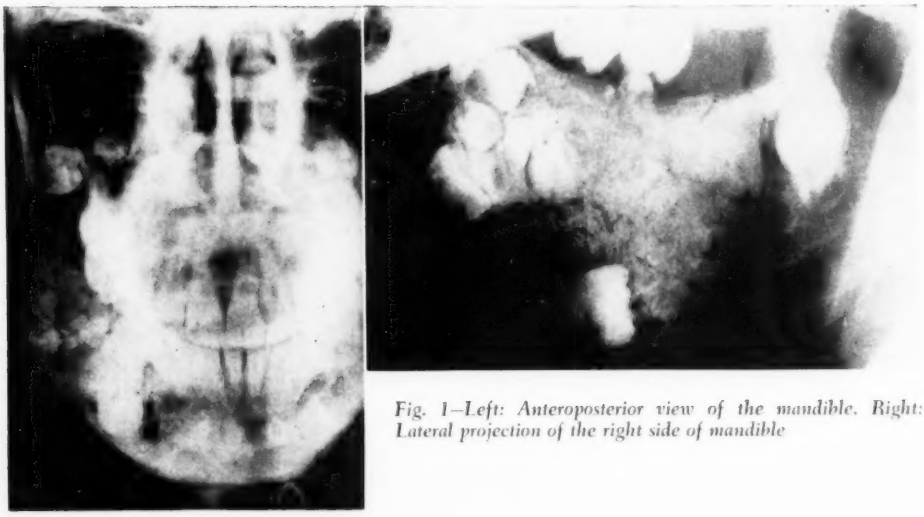


Fig. 1—Left: Anteroposterior view of the mandible. Right: Lateral projection of the right side of mandible

clavicle and the other over the center of the sternocleidomastoid muscle. No other pigmentations were present on the body.

The nose and throat were normal. The teeth posterior to the left mandibular cuspid were absent. The remaining teeth were normal and the occlusion was satisfactory. The heart and lungs were normal. The abdomen and extremities were normal. A complete blood examination showed no unusual findings and the Kahn reaction was negative.

The anteroposterior and lateral roentgenograms of the right side of the mandible revealed the presence of an expanding type lesion. The main body of the mandible presented a ground-glass appearance, with several small cystic regions surrounding it. There were numerous embryonic teeth present in the lesion (Fig. 1).

The skull was normal except that the cranium was small. The right shoulder and humerus showed no evidence of injury or other abnormality. There was no evidence of pulmonary, pleural or cardiac disease.

On March 24, 1948, a biopsy was taken intraorally under local anesthesia. A section was removed through the alveolar ridge from the center of the lesion. Sections of the biopsy (taken through the gingiva) showed complete alteration of the normal architecture of the bone and replacement by dysplastic fibrous

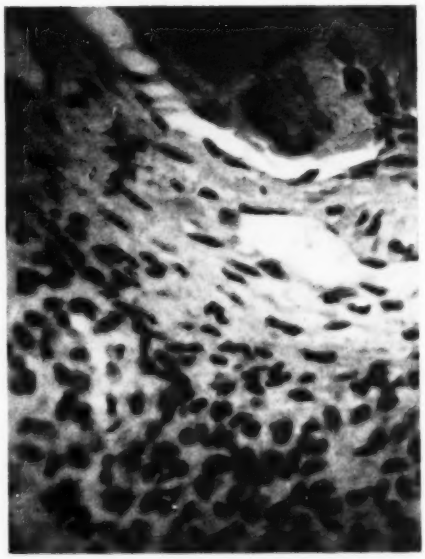


Fig. 2—Photomicrograph showing fibrous dysplasia

tissue and new bone. This fibrous tissue was composed of compact, small spindle-shaped cells. Dispersed within it were small roundish or ovoid islands of new bone, formed by metaplasia. Within some of the tissue fragments were observed larger, more or less calcified plaques of new bone. The picture was that of fibrous dysplasia, typical of that seen in jaw bones (Fig. 2). There was no evidence of odontoma formation.

The diagnosis was fibrous dysplasia of bone (mandible), apparently a solitary focus.

COMMENT—The patient has been followed since April 1947. Roentgenograms have been taken every six months. There has been little change observed in any of the studies. Careful clinical examination revealed a slight increase in the size of the mass and the amount of swelling in the right side of the mandible.

The diagnosis is of unusual interest because, in Schlumberger's exhaustive review of fibrous dysplasia, he quotes Jaffe and Lichtenstein, who reported only two cases of occurrence of the disease in the mandible. Schlumberger, in his summary, pointed out that monostotic fibrous dysplasia is not a congenital anomaly and etiologically has probably nothing in common with the form of polyostotic fibrous dysplasia found in Albright's syndrome. The roentgenograms and microscopic slides in this case were reviewed by Dr. Lichtenstein, who maintained that, despite the appearance in the roentgenograms of embryonic enamel organs, the picture represents true fibrous dysplasia in the mandible.—*1801 State Street.*

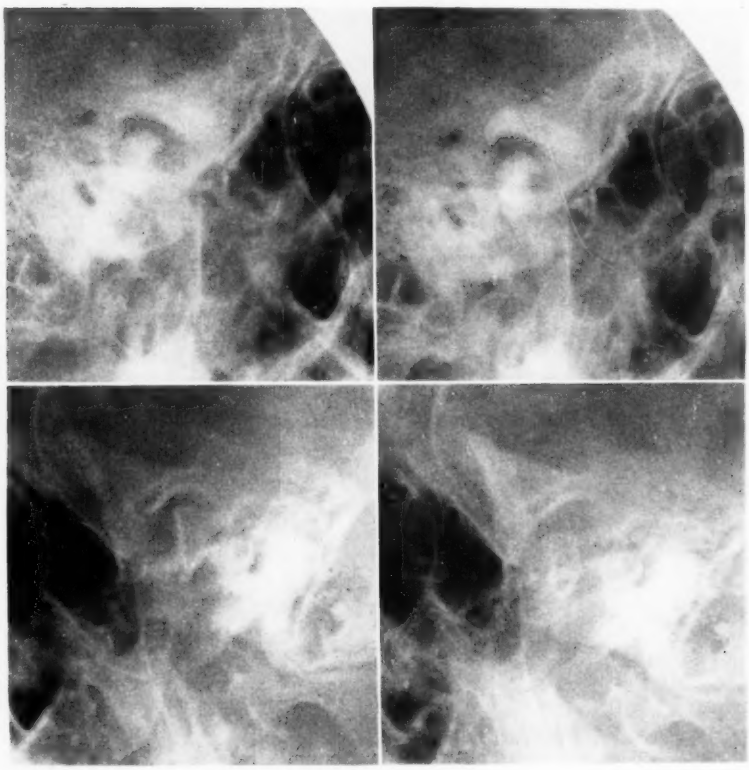
Chondrosarcoma of the mandibular joint: *report of case*

■ *R. P. Gingrass, D.D.S., M.D., Milwaukee*

The patient, a 46 year old woman, was first seen on March 22, 1950. She stated that during the past year she had noticed some swelling in front of the left ear that was slowly increasing in size. She had not been able to open her mouth as wide as formerly, and she had experienced pain when she attempted to force it and when she yawned. There had been some pain on mastication. Limitation of motion was greatest on awakening in the morning.

EXAMINATION—A small swelling was visible over the left mandibular condyle. It was firm to palpation and was only slightly painful. The mouth could be opened 17 mm. with the mandible deviating to the left. Further opening could be obtained with force but was very painful. Roentgenograms were taken of the mandibular joints (illustration).

TREATMENT—Exploration of the left joint was recommended. On June 27, 1950, under thiopental sodium anesthesia, the joint was exposed through a preauricular incision. The capsule was bulging; when it was opened a small amount of light yellow fluid escaped. The joint cavity was filled with reddish gray rubbery tissue which was easily removed with a curet. The meniscus was thin and roughened and was completely removed. An osteophyte on the lateral surface of the condyle was removed. The articular surface of the condyle was



Above left: Left mandibular joint, mouth closed. The condyle is displaced posteriorly in the fossa. There appears to be bone deposition on the articular surface of the condyle. Above right: Mouth open; slight downward and forward movement of the condyle is present. Below left: Right mandibular joint, mouth closed; normal. Below right: Mouth open, with normal movement of the condyle

roughened and had increased in size. It was smoothed with a file. The wound was closed with no. 00 surgical gut and silk. By September 18, 1950 the patient could open her mouth 28 mm. She could masticate all types of food without pain. There was some deviation of the mandible to the involved side when the mouth opened.

PATHOLOGY REPORT—Sections showed irregular fragments of fibromyxomatous and cartilaginous material. There were irregular patchy areas of finely stippled calcification. Some of the cartilaginous areas were irregularly interspersed with vascular fibrous tissue. The architectural arrangement of many of the cartilage cells was diverse and without any regular pattern. The individual cells were strikingly irregular in size, shape and staining characteristics. Many of the nuclei were hyperchromatic, irregular in shape, and bizarre in appearance. Some of the nuclei appeared to be in mitosis.

Also included were some irregular fragments of fibrous tissue, some of which appeared to become more cellular and vascular near a surface; others showed merging with cartila-

ginous tissue. No evidence of any old or recent inflammatory reaction of significant degree was found.

In view of the irregular arrangement of the cartilaginous material, the bizarre nature of the cartilage cells and nuclei with respect to their size, shape and staining characteristics, and the absence of evidence of inflammatory reaction, the cartilaginous overgrowth must be considered of neoplastic character with malignant potentialities. The diagnosis was chondrosarcoma.

COMMENT—Malignant tumors of the mandibular joint are uncommon. Further observation in this case will be interesting.—*208 East Wisconsin Avenue.*

Aberrant gland and sarcoidosis in the maxillae: *report of case*

■ *S. I. Kalman,* D.M.D., and S. P. Mallett,† D.M.D., Boston*

There has been little in the literature about aberrant glands associated with sarcoidosis. Most lesions of this type have been found in the tonsils[1]; in one case reported it was on the hard palate[2]; and one case was reported of an ectopically placed parotid gland in the mandible.[3] Poe[4] reported a case of sarcoidosis involving the mandible. No report could be found in the literature of an aberrant gland associated with sarcoidosis occurring in the maxillae.

Sarcoidosis is a generalized systemic disease which may involve any organ or structure of the body. The etiology is unknown and the disease seldom is fatal. In the case to be described it involved the lymph nodes of the left side of the neck, the chest and the maxillae.

The lesion of sarcoid is similar to that of tuberculosis. There is a distinct granulomatous nodule which shows epithelioid cells. Giant cells may or may not be present, and lymphocytes are plentiful at the periphery of the lesion. There is no caseation necrosis and the acid-fast stain is negative.[5]

REPORT OF CASE—A 54 year old, well-developed, white woman, in no acute distress, was admitted to the Boston City Hospital on January 18, 1952. Her chief complaint was drawing pain and uncomfortable "bumps" in the upper jaw. Two months previously the patient had been hospitalized for multiple tooth extractions (Fig. 1). One month later she had gone to several dentists in an attempt to get an upper denture, but was told that she required surgical reduction of multiple bony protrusions of the maxillary ridge before a denture could be made. She then came to the Boston City Hospital for correction of the deformed ridges.

Past medical history revealed that she had had a duodenal ulcer in 1932, a varicose vein had been injected in 1943, and because of

*Assistant resident, department of oral surgery, Boston City Hospital.

†Oral surgeon-in-chief, Boston City Hospital.

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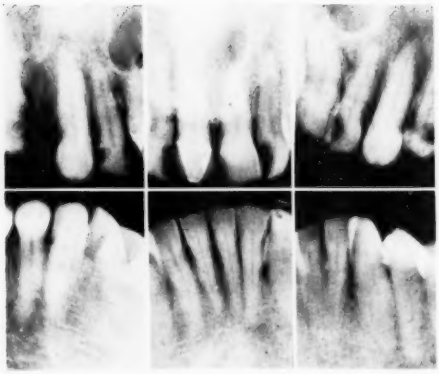

Fig. 1—Roentgenogram obtained from hospital where patient had been admitted for multiple tooth extractions shows well-circumscribed radiolucent area in the region of the upper central and lateral incisors

chronic cervicitis, a biopsy of the uterine cervix had been done four months prior to the present admission. Six left supraclavicular nodes had been removed three and a half months previously, and a diagnosis of sarcoid was made at that time. There was a history of cancer, hypertension and diabetes in her immediate family.

PHYSICAL EXAMINATION—Examination revealed an edentulous upper jaw with multiple bony irregularities and undercuts of both tuberosities. The general physical examination revealed nothing unusual. A routine roentgenographic study showed evidence of an area of bone destruction in the anterior maxilla near the midline. It was regular in outline (Fig. 2). A diagnosis of deformed maxillary alveolus with residual bone cyst was made. The preoperative urinalysis showed pH. 7.2; color, amber; specific gravity, 1.015; no albumin and no sugar. The blood count showed hemoglobin, 13, and white blood cells, 6,700.

TREATMENT—On January 19, 1952, under general anesthesia, an alveoloplasty was performed, and at the same time the mass in the maxillary anterior region was removed. The labial plate of bone was extremely dense and difficult to penetrate. The mass seemed to be in contact with the floor of the nose as there was no intervening bone. The tissue was extremely vascular and of a different consistency from that of a cyst. It was cauliflower in shape, pink-gray in color, about 1.5 cm. by .75 cm. in size and very friable, as evidenced by the fact that it was impossible to enucleate it in one piece. Absorbable sponge was inserted and the wound was closed with multiple no. 000 dermal sutures.

The patient's recovery was uneventful and she was discharged on January 21. At subsequent visits to the outpatient department, examination disclosed that a normal healing process was taking place, and she was referred to her dentist for construction of an upper denture.

The pathologist reported that the specimen was a seromucous branched tubulo-alveolar gland which showed focal granulomatous lesions consistent with sarcoid (Fig. 3). The acid-fast stain was negative.

It was impossible for the pathologist to be certain whether the gland was nasal or alveolar in origin.

POSTOPERATIVE ROENTGENOGRAMS—The chest film showed the diaphragms were smooth.

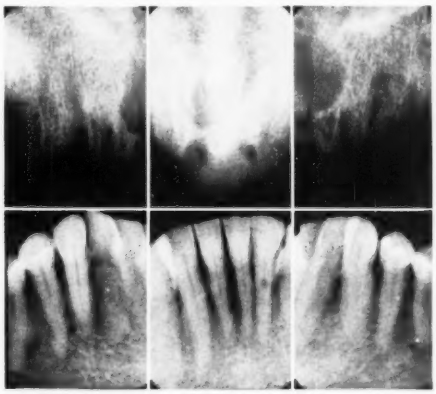

Fig. 2—Large radiolucent lesion in the maxillae

and the heart was not enlarged. Both hili were increased in size and density and had lobulated margins. The lung fields showed a slight increase in markings. The findings were consistent with sarcoidosis. There was a small area of density in the left first interspace which may have been due to scarring (Fig. 4).

DISCUSSION—Examination of the microscopic sections shown in Figure 3 will show that this is a well-formed, secreting, mixed gland. It was doubtful whether this gland was secreting into the nasal cavity, making it a nasal gland, or secreting into the oral cavity, thus making it a salivary gland. The micro-

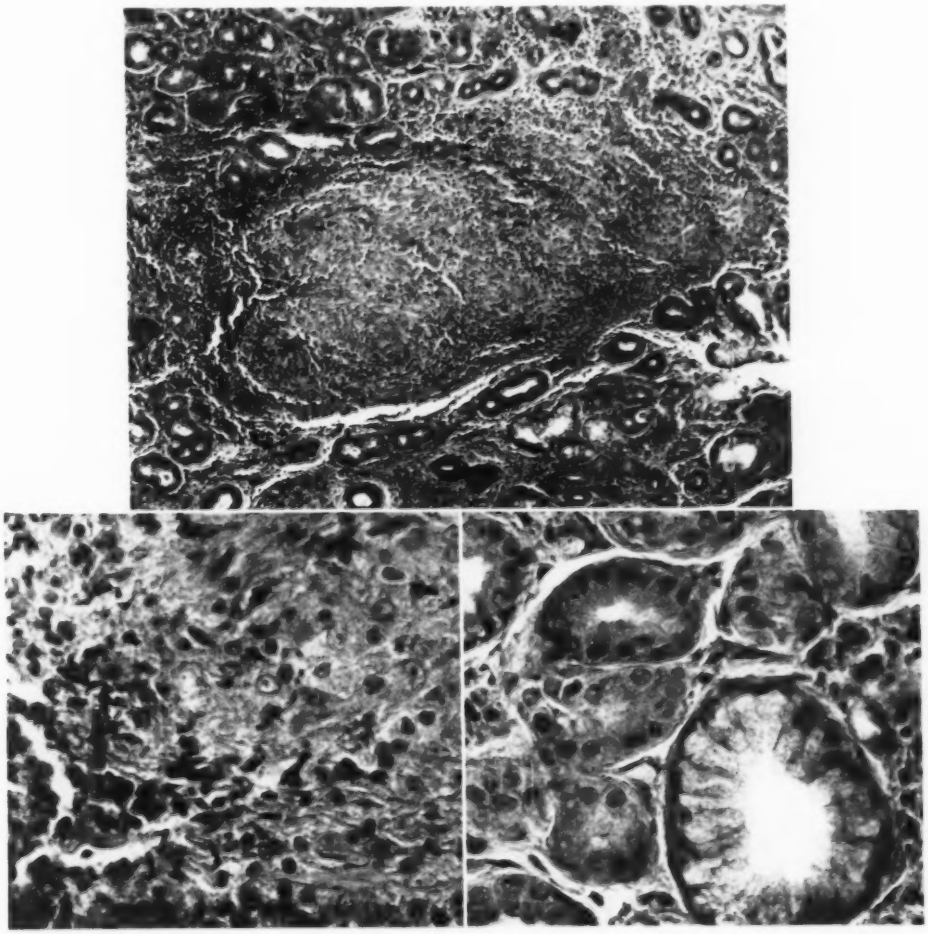

Fig. 3—Above: Low-power view of mass removed from the incisive canal area of the maxilla shows mixed gland with sarcoidosis. Below, left: High-power view through the granuloma shown in low-power view. Note epithelioid cells, lymphocytes and absence of caseation necrosis. Below, right: High-power view through glandular part of lesion.

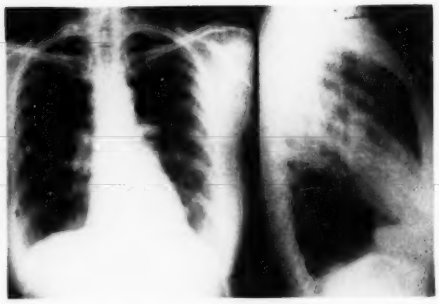

Fig. 4—Chest plates showing slight increase in markings, consistent with sarcoidosis

scopic anatomy of the gland shows that it could be either. Macroscopically, at operation, it seemed to be connected with the nasal cavity. By roentgenographic study it seems to extend to the nasal cavity; therefore, the gland may be nasal rather than salivary, although it is impossible to be sure.

SUMMARY—In the interpretation of radiolucent areas found in roentgenograms of the jaws, the remote possibility of the lesion being an ectopically placed gland, sarcoid, or both, must be considered. A case of aberrant glandular tissue with sarcoidosis has been presented.

Cyst of the inferior border of the mandible: *report of case*

■ *James L. Bradley, D.D.S., M.S.D., M.Sc. (Dent.), Great Lakes, Ill.*

On November 3, 1949, a 37 year old man, a sergeant in the U. S. Army, was admitted to the dental ward of the U. S. Naval Hospital, St. Albans, with a diagnosis of tumor of the mandible, type undetermined.

The patient complained of a foul tasting fluid in his mouth. He stated that approximately two months previously he had noticed a bulge on the left side of the mandible in the molar area. On pressure a foul exudate was expressed into the oral cavity. The patient thought he had noticed a slight elevation on the left side of the mandible for several years. He stated that the teeth had been extracted in this region approximately five years previously and that "they gave the dentist quite a bit of trouble." Two months ago he had pressed an elevation along the mandible and a foul green exudate had flowed into his mouth. The elevation had recurred about every two or three days. About one month after the first episode the patient had reported to the dental dispensary at Fort Dix and he was then referred to this activity.

His past history was not particularly enlightening with respect to his present condition. He could not recall any evidence of trauma to the face or head at any time.

EXAMINATION—The ears, eyes, nose and throat were essentially negative. There was a large localized swelling in the left mandibular

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Commander, Dental Corps, U. S. Navy, U. S. Naval Hospital.

Fig. 1—Radiolucent area on inferior border of mandible

region just below the inferior border. It was not painful and there was no loss of function. Oral examination revealed the entire upper and the lower posterior jaws to be edentulous. There was considerable recession of the gingiva of the lower anterior teeth with an abundance of calcareous deposits. Pressure on the mass on the left side of the mandible caused a flow of a yellow purulent exudate from a fistulous opening on the crest of the ridge in the left bicuspid region. A blunt probe could be passed down the fistulous tract for a distance of 3 cm.

Roentgenograms of the mandible revealed a smooth marginal defect of the lower border of the body of the left side of the mandible. There was considerable bony sclerosis around this area. A smooth walled channel approximately 5 mm. in diameter was evident leading from the defect to the alveolar ridge immediately above (Fig. 1). The impression derived from this roentgenographic examination was that it was a mandibular cyst, probably of the hemorrhagic type, which had apparently perforated through the lower margin of the mandible. Skeletal studies showed no abnormality.

GENERAL PHYSICAL FINDINGS—The patient was a well-developed and well-nourished young man in no acute distress. His temperature was 98.6° F., pulse 70, and respirations 20 per minute. There was a firm, nontender mass measuring 3 by 1 cm. attached to the inferior border of the left side of the mandible. Physical examination was otherwise within normal limits.

LABORATORY EXAMINATION — A smear taken from the fistula showed gram positive diplococci and streptococci. A culture of the exudate yielded nonhemolytic streptococci. Repeated studies for ray fungus were negative. The blood examination showed 4,940,000 erythrocytes, 9,300 leukocytes of which 76 per cent were polymorphonuclear neutrophils, 1 per cent polymorphonuclear eosinophils and 23 per cent lymphocytes. Hemoglobin was 14.5 Gm. Kahn test was negative. Serum calcium was 9.5 mg. per 100 cc., phosphorus was 3.1 mg. per 100 cc., and alkaline phosphatase 2.2 units. An aspiration biopsy was done which showed a few plasma cells with no evidence of a tumor.

TREATMENT—A preoperative diagnosis of mandibular cyst was made and an exploratory operation advised. At operation, under intravenous thiopental sodium and endotracheal nitrous oxide and oxygen anesthesia, an incision was made through the skin and subcutaneous tissue approximately 1 cm. below the inferior

Fig. 2—Postoperative appearance of the wound on second day

Fig. 3—Wall of cyst which was lined with squamous cell epithelium

border of the left side of the mandible in the bicuspid and first molar region. The external maxillary artery and anterior facial vein were dissected free, clamped, cut and tied. By blunt dissection the inferior border of the mandible was located. The periosteum was incised and elevated exposing a cystic mass (Fig. 2). The cyst along with its fistulous tract was dissected free and excised. Fibrin foam and thrombin were placed in the cavity. The deep structures were closed in layers and the skin was closed with four mattress and three interrupted sutures of no. 000 atraumatic Dermalon. After inserting a rubber dam drain into the surgical defect, a pressure bandage was applied.

POSTOPERATIVE COURSE—Healing was uneventful. The patient had been given 300,000 units of penicillin the day before operation and was placed on 50,000 units of penicillin every three hours postoperatively for a period of five days. An ice bag was placed to the jaw every hour for eight hours. He was allowed a soft diet. Codeine sulfate, ½ grain, and aspirin, 10 grains, were prescribed for pain. By November 19 all sutures had been removed. The fistulous tract healed by granulation. New dentures were constructed, and the patient was discharged to duty on December 20, 1949. On February 2, 1950 he reported back to U. S. Naval Hospital, St. Albans, New York. Roentgenographic evidence of healing was apparent and there was no further evidence of the fistulous tract.

PATHOLOGICAL REPORT—The specimen consisted of a thin, white, fairly smooth piece of tissue measuring 4 by 3 by 1 cm. A portion of the inner surface was practically covered with a red granulation tissue. On sectioning, a pale yellowish brown, more opaque tissue was seen within the tissue.

Microscopic examination showed the wall of a cyst which was lined with squamous cell epithelium beneath which there was a fibrous wall infiltrated with numerous plasma cells (Fig. 3). There were fragments of acutely inflamed granulation tissue enclosing an abscess. Serial sections failed to show evidence of actinomyces granules. Microscopic diagnosis was a radicular cyst.

COMMENT—The finding of a cyst at the inferior border of the mandible is unusual. The first impression was that the mass was a traumatic cyst. The patient could not recall any history of trauma to the jaw. The question of possible malignancy was ruled out by aspiration biopsy. The cyst was removed extraorally with primary closure. The postoperative course was uneventful and healing was by first intention.

Congenital fistulas of the lower lip: *report of case*

■ *Kimble A. Traeger, D.D.S., Charlestown, Mass.*

Congenital fistula of the lower lip is a rare and unusual developmental anomaly. It appears as a well-marked, circular depression in the vermilion of the lip, varying from a shallow dimple to a mucosal tract 2.5 cm. long. It may be so small as to be detected only by careful examination, or it may be of such a size that it is a source of embarrassment to the patient. The fistulas are usually bilateral and symmetrically placed on either side of the midline; however, unilateral cases have been reported. Often there is a nipple or snoutlike process, and a fistulous tract opens at the apex of the projection. If the openings are sufficiently large, a clear mucoid-like fluid will flow either spontaneously or on pressure. The flow of secretion may be sufficiently copious to require occasional wiping.

Frequently, cases of congenital fistulas of the lower lip are associated with severe cleft formation in the region of the upper jaw, particularly bilateral clefts of the lip, jaw and palate.[1] Hilgenreiner[2] reviewed the previously reported 54 cases and found that 33 cases were associated with cleft formation: 25 cases of bilateral cheilognathopalatoschisis and 8 cases of unilateral cheilognathopalatoschisis. More uncommon associated anomalies are clubfoot, syndactylism, symblepharon and accessory nipples.[3]

The term, congenital fistulas of the lip, which is generally used to describe the condition now, was first used by Rose in 1868.[4] This condition has also been referred to as congenital pits, recesses, paramedian sinuses and congenital mucous cysts. They have sometimes been mistaken for external salivary fistulas of the submaxillary or sublingual glands.

The etiology of congenital fistulas of the lower lip is obscure. The various hypotheses put forward as to their significance are almost as numerous as the cases reported. It is well established, however, that this malformation shows a hereditary relationship as to incidence.

REPORT OF CASE—The patient, a 20 year old Caucasian sailor, was first seen at the dental clinic of the Boston Naval Shipyard on November 12, 1952 where he reported for a routine dental examination. It was immediately noticed that the patient was particularly reserved and somewhat timid in his behavior. As soon as the patient started to speak, the reason for his behavior was obvious. His lower lip was grotesque. It seemed unusually large or swollen, and symmetrically placed on either side of the midline was a depression or opening surrounded by a slightly raised wall of tissue which measured about 6 mm. in diameter. The color of the disklike depressions was darker than the adjacent labial tissue and stood out prominently (Fig. 1).

A closer examination revealed that a clear viscid fluid was slowly flowing from these openings, and on pressure to the lower lip, the flow was greatly increased. The patient stated that the flow was spontaneous and was sufficiently copious to require occasional wiping. His uniform frequently became soiled as a result of these secretions and the condition was a source

The opinions or assertions contained in this article are the private ones of the writer and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

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of much embarrassment to him. He did not notice an increased flow during mastication or at mealtime.

A silver probe, corresponding in size to an 18 gauge needle, could be introduced easily into the opening of lip, and extended down a fistulous tract for a depth of about 1.5 cm. Each fistulous tract ended blindly and there was no communication between the two. The direction of the probe when inserted in the fistula was downward and backward into the substance of the lip toward the mucosal surface.

Fig. 1—Bilateral congenital fistulas of the lower lip as they appeared when patient was first examined

Roentgenographic examination with probes inserted into the fistulas was of no significance, except that it demonstrated their depth and course. Injection of radiopaque media was attempted, in order to examine the size and direction of the fistulas more precisely, but this was unsuccessful because the media was continually pushed out by the mucous secretion.

Past history of the patient revealed that the fistulas of the lower lip were present at birth and there had been no remarkable change in their size or appearance over the past few years. He stated that at the age of three he was operated on for repair of a cleft palate. Examination of the postoperative scar seemed to indi-

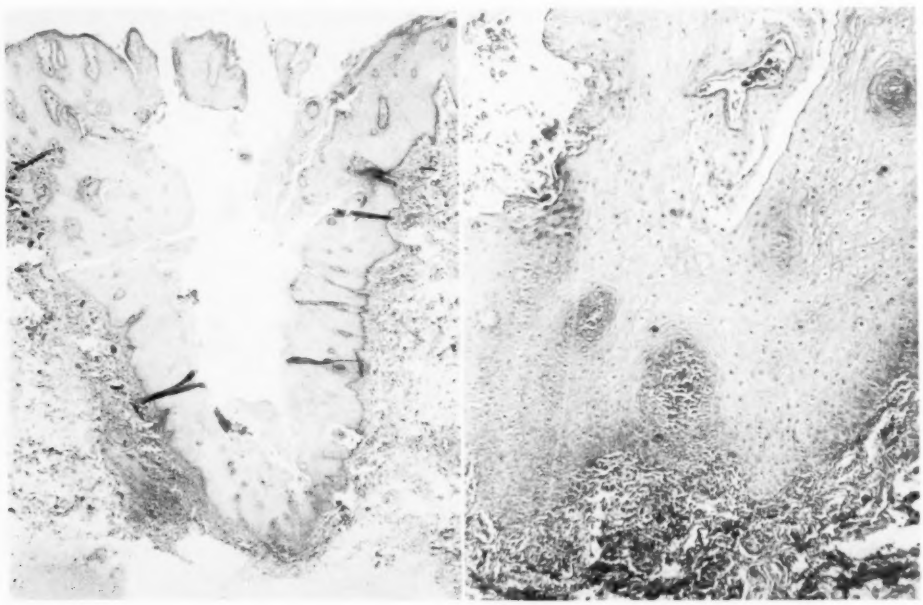

Fig. 2—Left: A sinus lined by epithelium extended deep into the underlying connective tissue. Right: Base of the fistula

cate that there was a cleft of only the soft palate. Digital examination of the hard palate revealed no bony defect or break in its continuity. There is nothing to indicate that the patient had a cleft lip, and no other anomalies were noted.

According to the patient, the condition of his lower lip was not unusual for his family. He states that his mother and maternal grandmother both had the condition, in addition to some of his other relatives, but that the condition was not particularly noticeable in some of this group. To his knowledge, no member of his family or relatives had cleft lip, cleft palate, clubfoot, or other anomalies.

From the clinical findings and the history, a diagnosis of congenital fistulas of the lower lip was made. The treatment of choice obviously was complete excision of the fistula. It was felt that an elliptic excision would provide complete removal of the fistulas with the best cosmetic result. V-excision, as in removal of carcinoma of the lip, did not seem necessary.

Under regional anesthesia, an elliptical incision was made from about 1 cm. distal to the fistula on the left side, extended medially parallel to and slightly above the vermilion border and across the midline to a point about 1 cm. distal to the fistula on the right side. A similar incision was made just lingual to the fistulas. The anterior incision was extended downward and backward to a depth just below the base of the fistulas. The posterior incision was extended downward to communicate with the anterior incision. Both fistulas including the labial tissue between the two were removed as one single wedge of tissue. Remnants of glandular tissue remaining at the base of the excised area were removed. The labial mucosa was slightly undermined and the edges of the incisions were brought together by vertical mattress sutures.

Histological examination of the excised tissue revealed a section of mucous membrane covered by slightly irregular but well contained stratified squamous epithelium. In the center of the latter, a sinus lined by similar epithelium extended deep into the underlying connective tissue. The deep extremity of this tract was closely approximated to salivary ducts and gland tissue. The connective tissue at this point was heavily infiltrated by chronic inflammatory cells. Surrounding and deep to the glandular tissue there were bundles of skeletal muscle (Fig. 2).

Fig. 3—Lower lip as it appeared six weeks after excision of fistulas

Healing was uneventful and all sutures were removed the fourth postoperative day. The patient was not seen again until six weeks postoperatively. At that time healing was complete, and the cosmetic improvement was very marked (Fig. 3).

COMMENT—According to the literature, congenital fistula of the lower lip is very rare, and the number of cases reported is very small. The condition may be more prevalent than is indicated because of mistaken diagnosis or the fact that, in many cases, the malformation is so small that it goes unnoticed.

This case is unusual in that the size of the fistulous opening was distracting in appearance even to the casual observer, and it illustrates the cosmetic improvement which can be accomplished by simple excision.

Radicular cyst within the maxillary sinus: *report of case*

■ *Richard J. Burch, D.D.S., Eufaula, Okla.*

A 29 year old pilot, evacuated from Korea, reported for diagnosis and treatment on February 28, 1952. In 1945 he had suffered three exacerbations of painful swelling on the right side of the face. Subsequently three maxillary molar teeth had been extracted. There had been no further symptoms until February 15, 1952, when the patient had again suffered a painful swelling in the same part of the face. This swelling had ruptured spontaneously into the right superior mucobuccal fold with considerable drainage of pus.

Physical examinations revealed that the patient's general physical condition was noncontributory. The removal of a gauze drain from the right mucobuccal fold revealed a suppurating fistula just anterior to the maxillary tuberosity. A silver probe was passed into the fistula for approximately 2 cm. (illustration, above left) before any resistance was encountered. Since the probe apparently passed directly into the antral cavity, at first an oroantral fistula was indicated.

Laboratory findings were within normal limits, except for the coagulation time, which was 10 minutes and 55 seconds. The time in repeated tests averaged 9 minutes and 15 seconds. The results from a clot retraction study for time and quality were within normal limits. Routine intraoral roentgenograms revealed no significant abnormalities. Waters' position roentgenograms of the maxillary sinuses revealed an irregular dense mass with a rounded superior border completely filling the inferior two thirds of the right maxillary sinus (illustration, above right).

The fistulous tract (illustration, center) was left open and irrigated daily with penicillin solution, 1,000 units per cubic centimeter of normal saline solution. As the patient had been asymptomatic since spontaneous drainage, no other antibiotic therapy was given. The patient's blood was typed; a donor with compatible blood was found for fresh whole blood transfusion in the event of operative or postoperative hemorrhage. On March 10, 1952, the operation was performed with the patient under anesthesia induced by thiopental sodium-curare administered intravenously and nitrous oxide-oxygen administered by nasal intubation. A 7 cm. oral incision was made beginning at the pterygomaxillary junction and extending anteriorly along the alveolar crest over the canine eminence. The mucoperiosteum was elevated; a large circumscribed soft tissue mass was removed by blunt dissection through the floor of the antrum and sent to the laboratory for section and diagnosis (illustration, below left). The mass had completely obliterated the posterior osseous floor of the antrum and was firmly fixed to the regional soft tissue.

A window was cut in the antral wall of the canine fossa to provide visibility and to facilitate the completion of an intranasal antrostomy for postoperative irrigation and drainage. The antrum was thoroughly inspected and except for the fistulous opening was found to be normal. The oral incision was closed with continuous no. 00 silk and deep stay sutures placed to approximate the soft tissue at the floor of the antrum. The laboratory report established the diagnosis of infected radicular cyst. Postoperative recovery and healing were uneventful, and

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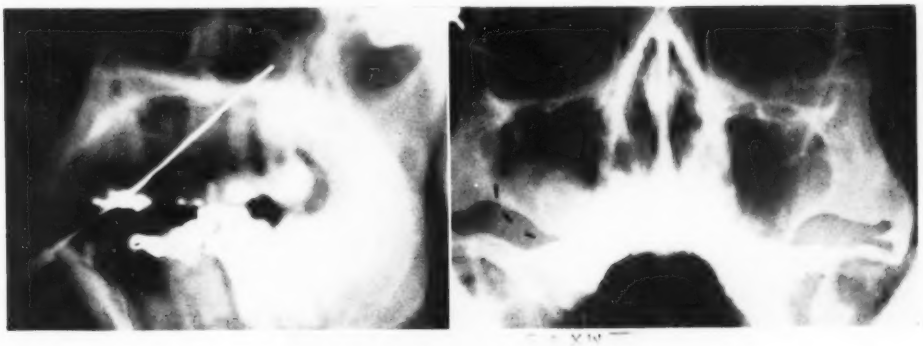
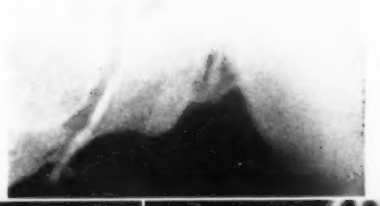


Above left: Silver probe passed into fistula in right maxillary sinus. Above right: Irregular dense mass in right maxillary sinus



Center: Fistulous tract. Below left: Specimen removed from maxillary sinus. Below right: Condition of sinus 15 days after operation

the patient was discharged 15 days after the operation (illustration, below right).

COMMENT—The preoperative diagnosis could not be established definitely. After preoperative study, it was decided that the procedure of choice was a modified Caldwell-Luc operation. The postoperative diagnosis was infected radicular cyst.

This case demonstrates the value of a thorough preoperative investigation and preparation. In particular, it demonstrates the possibility of mistaking an acutely infected maxillary bone cyst for sinusitis with the formation of an oroantral fistula.—*302 South Main Street.*

The care of the cleft lip and palate patient

THE DESIRABILITY of a dental education as a scientific background for all who do cleft lip and palate surgery should be very evident. In spite of this, the thought has been expressed in some quarters that the care of such patients should be within the realm of plastic surgery and should not be included within the scope of the oral surgeon. Such an attitude reflects a lack of understanding of this rather complex and important problem and does not give due consideration to its many complex ramifications. Actually, total care of such patients entails a good understanding of not only the surgical aspects of their repair, including the associated preoperative and postoperative management, but also calls for a good background in several aspects of dentistry such as orthodontics, prosthodontics, and pedodontics, as well as a good working knowledge of speech mechanics.

There are, of course, many plastic surgeons who are exceptionally well equipped to care for such patients, obtaining results that are almost universally excellent. Such men usually have had the benefit of both medical and dental educations or, by virtue of unusual application and opportunity, have been able to develop a good understanding of dental anatomy, physiology and pathology. However, it is virtually impossible for any man to develop special abilities in all fields of surgery, not solely because he would be unable to develop the mechanical ability required for operations in varied fields but primarily because he cannot wholly comprehend the widely diversified anatomy, physiology, and pathology that exist in each instance. As a result, it is the accepted policy in many large institutions for the urologist to do plastic reconstruction of the ureteropelvic junction in treatment of congenital ureteral stricture, as well as plastic reconstruction of hypospadias. He alone is best acquainted with the local anatomy, physiology, and pathology that may be present in such circumstances. Likewise, the orthopedist is best suited to do arthroplasties, bone grafts and other orthopedic reconstructive procedures because he is not only better schooled in, and more familiar with, the involved anatomy, but also because he is continuously conscious of the function of the system for which he is responsible.

In the same sense, the oral surgeon, being intimately associated with the lips, jaws and palate in his professional background and in his day-by-day work, is better schooled

in the basic function of the orofacial mechanism than any other professional group. Dentistry was born to fulfill a need to care for a portion of the body that has special problems which in many ways are dissimilar to those found elsewhere. Oral surgery has developed as a specialty to care for the surgical needs of that area of the body and in many ways has brought medicine and dentistry closer together, much to the advantage of the patient. As in other specialties of medicine, the oral surgeon is best suited to understand and surmount the local problems of anatomy and function that are typical of the cleft lip and palate patient.

Such understanding of the orofacial area is best developed by a basic dental education whether the student goes on and further develops himself by earning a medical degree and later becomes Board qualified in plastic surgery; or goes in the other direction and takes comprehensive training in oral surgery, leading to Board qualification in that specialty. In either event, such a trainee will have received a basic education in dentistry which always will be of great benefit. Given adequate graduate training in cleft lip and palate care, both the oral surgeon and plastic surgeon will then develop into equally well-qualified men in the care of patients of this type. As such they should be given equal opportunity to work in a field that has always been and will always remain a major source of interest in dentistry. Without the benefit of a dental background, the plastic surgeon cannot, except in relatively unusual circumstances, develop the best possible understanding of the total care of the patient with cleft lip and palate deformities.

The present work that is being done in dentistry on the subject of growth and development of the orofacial region in relation to cleft lip and palate deformities and their repair is but one example of the part that dentistry is playing and will have to continue to play if all patients are to receive the benefit of the best possible treatment. With the continuing interest and development that is present in dentistry and oral surgery, it would seem of paramount importance that cleft lip and palate care be kept within that sphere of influence. At least, men in training preferably should have a dental background; and every oral surgery service, if it is headed by a man well schooled in cleft lip and palate care should have an equal opportunity to demonstrate its ability to contribute to the rehabilitation of this group of patients. Certainly, no one could be in better position to guide the patient back to a state of relatively normal function in a highly competitive society, which in the final analysis should be the ultimate goal.

There is, of course, no room for jurisdictional disagreement. Prime consideration must always be for the patient. However, until there is mutual understanding by all concerned that it is always desirable for the trainee to have the benefit of a dental background, be he plastic surgeon or oral surgeon, the entire potential of the educational aspects of this problem will not be fully developed.

■ Precautions to Be Taken with Patient Receiving ACTH

Q.—What precautions should I take in performing surgery on a patient who has been receiving ACTH or cortisone?

A.—The basic facts are these: A patient who has been receiving either ACTH or cortisone for a long period of time is likely to have a poor "alarm reaction" to any new stress. If he has been on ACTH, his pituitary gland will be slow to produce natural ACTH to stimulate the adrenal glands, and his adrenal glands may be near exhaustion. If he has been on cortisone, the adrenal glands themselves will be slow to produce natural cortisone. Therefore, the natural ability of the body to oppose a stress of any kind is diminished.

Stopping the ACTH or cortisone after the body has become used to it leaves the defense mechanisms weakened. As a rule then, surgical procedures should be done while the patient is still on his full ACTH or cortisone dosage, or they should be postponed until at least one week after the medication has been stopped. In either case, certain precautions must be taken:

1. The patient should be on heavy antibiotic therapy; the possibility of infection and septicemia is much increased by ACTH or cortisone therapy.

2. If the patient is receiving ACTH or cortisone, hemorrhage may be prolonged, so good hemostasis must be obtained.

3. If ACTH or cortisone therapy has been stopped recently, the patient's blood is susceptible to rapid clotting and the consequent danger of embolus formation.

4. The oral surgeon should cooperate with the patient's physician in treating the problem at hand.

■ Technic for Taking Sialograms

Q.—What technic do you suggest for taking sialograms that will reveal the ducts of the parotid and submaxillary glands with their arborization?

A.—A satisfactory technic consists of the employment of a combination of two types of contrast media. A penetrating solution of iodopyracet (Diodrast), which has low surface tension, is first instilled in the duct and this is followed by the injection of a heavier solution of Lipiodol. A total of 1 to 2 cc. usually is adequate for this purpose. The procedure is painful, and the patient who needs this diagnostic procedure will require adequate sedation.

■ Antibiotics

Q.—What is the antibiotic of choice in the treatment of infections of dental origin? Is one more effective than another, or are several considered equal?

A.—Penicillin generally is considered to have the widest bacterial coverage of all the antibiotics available at the present time. It therefore is conceded to be the initial drug of choice unless the patient has a history of penicillin sensitivity. On some occasions it may be desirable to combine penicillin with streptomycin to obtain wider coverage and thereby include

This section, devoted to queries and comments from readers on topics of current interest to oral surgeons and general dental practitioners, is edited by James R. Hayward, University Hospital, Ann Arbor, to whom readers are invited to send their communications. The answers, prepared by competent consultants, do not necessarily represent the opinions of any official scientific organization. Your participation in this section is invited.

The Editor

the enterococcal group of organisms which are encountered frequently in oral infections. These drugs are available commercially in their combined form and have proved to be popular because of their exceptionally wide zone of antibacterial action.

Erythromycin also has a relatively wide coverage and has the distinct advantage of being very effective when administered orally. Chlortetracycline (Terramycin) and oxytetracycline (Aureomycin) also have been reported as clinically effective in infections of dental origin, but they are usually reserved for use with the patient who is known to be sensitive to penicillin, or for use when the bacteria have clinically demonstrated their resistance to penicillin and streptomycin.

If the bacteria are available for culture, they may be subjected to laboratory tests to compare their relative sensitivity or resistance to the various antibiotics. If the bacteria are found to be resistant, then a correct therapeutic program can be instituted.

■ Cortisone and Oral Surgery Procedures

Q.—What is the clinical significance of previous cortisone administration in the history of a patient who must undergo oral surgery procedures?

A.—The expanding use of cortisone in the symptomatic treatment of many systemic diseases must be regarded with respect by the oral surgeon. The local and constitutional effects of this agent present hazards to anesthesia and surgery. Although it still is too early to evaluate cortisone, some clinical information has been accumulated. Since cortisone reduces inflammatory reaction, masked local and systemic infection may be present while the patient is on cortisone therapy. Although experimental work has shown a reduction in fibroblastic activity with delayed healing during cortisone administration, our supervised patients on cortisone therapy have withstood extractions and minor oral surgery without clinical evidence of delayed healing. The chief hazard appears to be adrenal cortical suppression in patients who previously have been on cortisone therapy. Such a patient is a poor risk for general anesthesia, since his unbalanced physiology makes stress situations predispose to irreversible shock. The use of cortisone therapy should be a salient feature in the preoperative history of all patients.

■ Radiolucent Area

Q.—A distinct and extremely radiolucent area is present in the roentgenograms of the anterior region of an edentulous maxilla. The teeth in this region had been extracted three years ago, and previous to that a root resection had been performed. No other abnormalities are seen in the roentgenogram. Should this region be biopsied?

A.—The persistent bone loss probably is due to previous destruction of both the labial and lingual cortical bone of the alveolar process as the result of the initial periapical condition or of the resection procedure. Bone will not regenerate in such a region. If the roentgenograms taken prior to extraction are available, they should verify this impression and rule out the necessity of biopsy as a diagnostic procedure.

■ Reduction of Pain in Dry Sockets

Q.—Is there any method for reducing the extreme pain caused by dry sockets other than by the use of local dressings and packs?

A.—Long-acting local anesthetic agents may be helpful in extreme cases. One cc. of Efocaine used in a conductive block will keep the patient free from pain for a period of three days, and this procedure may be repeated if necessary. During this time the socket should be irrigated gently and be protected from secondary infection.

■ ROENTGEN, RADIUM AND RADIOISOTOPE THERAPY. By A. J. Delario. 371 pages with 65 illustrations and 155 tables. Index. Price $7.50. Philadelphia, Lea and Febiger, 1953.

This book presents practical material in a brief form on the use of radioactive isotopes in the diagnosis and treatment of disease. Radiosensitive tumors and the biological changes produced by radiation are fully discussed. Since it is written by a physician and therapeutic radiologist, it is more readily understood by the clinician than are books for this purpose written by physicists. Not only is the material presented in a form directly applicable to the treatment of disease, but even the sections on the physical and mathematical fundamentals of radioactivity are given in the language of the clinician. This makes for a ready understanding on the part of the clinician in attempting to familiarize himself with this new field.

The section on "The Biological Use of Radioactive Isotopes" is very short, and only brief mention is made of the results of tracer studies in disease. No attempt is made to survey the technical methods of using radioisotopes in investigation. There is, however, a detailed presentation of the estimation of dose and the measurement of radioactivity for all clinical and experimental purposes.—*William Ward Wainwright.*

■ BASIC BIOLOGY OF MAN. By G. Kasten Tallmadge. First edition. 244 pages with 16 line illustrations. Index. Price $3. New York, Random House, Inc., 1952.

Doctor Tallmadge's work is written with charm and clarity. He has been so prominently identified with this science that he is qualified to speak with authority on the subject. His descriptions are so clear and easily understood that the book becomes easy and interesting reading. The text is illustrated with 16 diagrammatic sketches, and wherever possible the use of technical terms have been avoided.

The author explains the principles, processes and all the relationships within the human organism, from the simple cell to the formation and functions of the tissues, the skin, the locomotor apparatus, the digestive, circulatory, respiratory, urinary and reproductive systems.

The volume could be used readily in a non-professional education, in which precision in detail is not necessarily emphasized. It also can be highly recommended for lay reading, as an authoritative guide to the structure and functions of the human body. It is a carefully edited work, well printed.—*E. Alan Lieban.*

■ CONDUCTION ANESTHESIA. By George P. Pitkin. Edited by James L. Southworth, Robert A. Hingson and Winifred M. Pitkin. Second edition. 1,005 pages with 585 illustrations. Bibliography, bibliographic index and index. Price $22.50. Philadelphia, J. B. Lippincott Co., 1953.

In the preface to the first edition of this book, conduction anesthesia is described as "the interruption of nerve conduction, principally sensory conduction without obtunding consciousness. It includes local infiltration, nerve blockings and combinations thereof; single injection and continuous spinal anesthesia, caudal block, peridural block, and refrigeration anesthesia."

It is stated in the preface to the present edition that Pitkin's concept was that conduction anesthesia was the safest form of anesthesia for any operation. The editors agree that, in view of the advances made in other forms of anesthesia, these views should be modified. However, they still emphasize the fact that

"conduction anesthesia technics, along with proper preoperative medication and psychological preparation of the patient, are adequate for most operations and desirable for many."

This book is written with the previously stated concepts in mind. Therefore, if one evaluates the role of conduction anesthesia carefully as far as the particular patient or procedure is concerned and decides that this is the method of choice for the case at hand, this book is an invaluable fountain of information.

Emphasis is placed on precise anatomical injections carefully made according to previous meticulous study of the various landmarks and their relationship to the nerves which are being blocked. This is in contrast to the many so-called "shot-gun" technics which depend on many injections which obtain their objectives by having the tissues bathed in huge quantities of anesthetic solutions. For this reason, there are many excellent chapters on anatomy and innervation of the various parts of the body. Careful attention is given to such topics as the vertebral canal and its contents, the anatomy of the cranial nerves, the anatomy of the spinal nerves and the gross and microscopic anatomy of the autonomic nervous system. These chapters are excellently illustrated and extremely well described.

Because of the necessity of knowing the fundamentals, there are several chapters devoted to a clearer understanding of the clinical pharmacology of the local anesthetics. These chapters include an evaluation of the drug lidocaine which the authors believe to be outstanding. Another fine chapter is the one which includes such principles as operating with conduction anesthesia, the psychological preparation of the patient, the actual technic used and the armamentarium required to do an excellent job while working with this method of anesthesia.

Of particular interest to those in the field of oral surgery is the chapter entitled "Blocking the Trigeminal Nerve." In this section the various technics are carefully described and illustrated for many major procedures about the head and neck under conduction anesthesia. The omission of technics for dental anesthesia *per se* is a deliberate one because the editors state that there are other volumes more suitable to this phase of anesthesia which cover the topic much more adequately than can be done in this book. The final chapter, entitled "Complications of Conduction Anesthesia," is one which should be read by all who employ this technic. An up-to-date bibliography appears at the end of the book and appears to be complete.

This book is clearly written with close attention to detail and with a minimum of superfluous material so that whatever necessary information regarding conduction anesthesia one seeks is to be found readily, pleasurably and profitably.—*Marvin Revzin.*

■ Tumors of the Thyroid Gland. By Shields Warren and William Meissner. 97 pages with 82 illustrations. Price $1.75. Washington, D. C., Armed Forces Institute of Pathology, 1953.

■ Tumors of the Lower Respiratory Tract. By Averill A. Liebow. 189 pages with 249 illustrations and 3 color plates. Price $1.25. Washington, D. C., Armed Forces Institute of Pathology, 1952.

■ Tumors of the Male Sex Organs. By Frank J. Dixon and Robert A. Moore. 177 pages with 135 illustrations. Price $1.50. Washington, D. C., Armed Forces Institute of Pathology, 1952.

These are fascicles 14, 17, 31b and 32, respectively, of the *Atlas of Tumor Pathology* published under the auspices of the National Research Council, sponsored and supported by the American Cancer Society, the Anna Fuller Fund, the Armed Forces Institute of Pathology, the Jane Coffin Childs Memorial Fund for Medical Research, the National Cancer Institute of the Public Health Service and the United States Veterans Administration.

As the publication is essentially an atlas, the text is largely—but far from wholly—limited to descriptive material to go with the illusrations. These illustrations are superb and are reproduced on fine quality heavy paper with

great fidelity. Although there is no index, each monograph is preceded by a very complete table of contents. A very adequate list of references follows each section of text. Although each fascicle bears the name of only one or two authors, a veritable host of able workers have made valuable and indispensable contributions. This atlas, of course, is a tool of incomparable value in the hands of physicians and pathologists dealing with tumors; but because of the recent very considerable progress in chest surgery and diagnosis combined with noteworthy increase in the incidence of primary lung tumors, the interest in fascicle 17 will be unusually great.—*Edward H. Hatton.*

■ ANATOMIE COMPARÉE CRANIO-FACIALE ET DENTAIRE. By M. Friant. 107 pages with 80 illustrations. Price not listed. Index. Paris, Julien Prélat, 1953.

This volume on craniofacial and dental comparative anatomy is written for the "non-specialized reader." In the first chapter, the main characteristics of the jaws and teeth of the vertebrates are summarized. The second chapter is a detailed study of the cranium of the dog and that of man. In the third chapter, which is devoted to a comparison of the dental anatomy of mammals and of man, the main lines of dental evolution are traced briefly with special emphasis on the most complex aspect of the teeth of mammals, the direction of development of the molars.

From this study the author concludes: "From the most primitive fish . . . to man, an identical plan of organization is revealed in the skeleton of the cranium and of the face, in spite of the varied adaptations of the vertebrates."

The illustrations are exceptionally clear and abundant though by no means inclusive. It is obvious that a volume of this size on so broad a subject must be extremely condensed.

In his preface to the book, Dechaume declares that comparative anatomy should have its place in the dental training program and that this book "will find a large audience among students, specialists and all who are interested in these problems."—*G. Nichols.*

■ TEXTBOOK OF EXODONTIA. By Leo Winter. Revised by William F. Harrigan and Leo Winter, Jr. Sixth edition. 350 pages with 385 illustrations and one color plate. Index. Price $8. St. Louis, C. V. Mosby Company, 1953.

The revised edition of this well-known text on exodontics is essentially the same as the previous edition with the same illustrations. The chapter on general anesthesia has been deleted and additional short chapters on chemotherapy and antibiotics, hemorrhage and diagnosis have been added.

The profuse illustrations make this book a very practical treatise on the subject and offer greater benefit than the text, which treats some subjects incompletely. The chapter on technic for the use of local anesthesia gives concise descriptions of the technical procedures and depends on good illustrations for anatomical information, while the chapter on accidents in local anesthesia might have been revised more carefully.

The thorough illustration of the instrumentation for the extraction of teeth and the most favorable position for the operator in applying the technics described is well done and can be studied with profit. The removal of impacted teeth and broken roots is also well presented. The student who peruses this book with care cannot fail to profit.—*Charles W. Freeman.*

■ PERIODONTOLOGY. By Frank E. Beube. First edition. 752 pages with 492 illustrations and 31 tables. Index. Price $15. New York, Macmillan Company, 1953.

This outstanding text ranks equally with the best books available on periodontology. It is of equal value to both the undergraduate student and the graduate dentist.

The 26 chapters are placed in such order that periodontology may be understood easily by the new student. Each chapter is introduced by an outline of its contents, and each is complete in itself. No chapter is too long or out of proportion to others in the volume.

All subject matter is presented concisely. The photographs and drawings are well selected and reproduced. The 31 tables are both valuable and unique. The bibliography is extensive, with numerous references for additional suggested readings.

Many texts seem to be written with the main purpose of presenting the beliefs and researches of the author. This one does not. One gains the impression that the author has presented a composite of the good work in his field, and integrated his own material as an important contribution. All subject matter is handled with the goal of successful periodontal treatment constantly stressed.

Criticisms of the book are few. An outline of the etiologic factors in periodontal disease and a classification of the periodontal disease might strengthen the presentation. In addition, perhaps too little attention has been given to occlusal discrepancies in relation to changes in the temporomandibular joint.

In final analysis, the reviewer is impressed with the straightforward and lucid way in which the vast subject of periodontology is covered.—*Zar A. Reader.*

■ Zahnärztliche Fortbildung. Heft 8. Zahnärztliche Röntgendiagnostik. By Hans Heuser. 157 pages with 488 illustrations. Index. No price listed. Leipzig, Johann Ambrosius Barth Verlag, 1952.

This volume, the eighth in the "Dental Education" series, "provides a swift orientation for the dentist in the possibilities and limitations of roentgen diagnosis." Much of the space of the book is filled with exceptionally clear roentgenograms.

The author's main concern in the volume is to warn the dentist of the possibilities of making false diagnoses that lead to unnecessary extractions and futile attempts at correction of nonexistent abnormalities. Because of the vast scope of the subject of roentgenography, this volume is limited strictly to the interpretation of roentgenograms from the clinical point of view.

In the introduction, directions, supplemented with illustrations, are given for determining the proper plane and angle for taking the roentgenograms. The first chapter deals with false diagnoses based on normal anatomical variations which appear in roentgenograms and confuse the interpretation. Such anomalies include oral structures; deviations in the development of deciduous changing dentition; variations in teeth as to size, form, number, retention and persistence; and double formations.

Several chapters are devoted to difficulties in the interpretation of roentgenograms, including those of hidden proximal caries, the pulp and root canal system, periapical conditions, periodontal disease, dental focal infection, diseases of the alveolar process and the jaw bones, inflammation of the alveolar fossa, disturbances of the temporomandibular joint and various types of oral tumors. For exact location of the specific area under discussion, arrows are used frequently within the roentgenograms.

In the final chapters, emphasis is placed on the importance of the adequate use of roentgenograms to assist the dentist in planning an operation, to provide control in the healing process and to evaluate the result. The author again warns that roentgenograms cannot be used to maximum advantage unless the dentist is on his guard against the possibilities of false interpretation.

The aim of the author, to provide practical information for the practicing dentist, seems to be achieved in this volume.—*G. Nichols.*

■ Developmental Pathology of the Face and the Dysraphic Syndrome—An Essay of Interpretation Based on Experimentally Produced Congenital Defects. Gustavo Sanvernero-Rosselli. Plast. & Reconstruct. Surg. 11:1 Jan. 1953.

Europeans have made a number of contributions to the study of congenital abnormalities. The term dysraphia is used to refer to all conditions manifested by disturbance in the coalescing of median raphes.

Factors producing congenital defects include genetic influences, roentgen rays, toxic factors, maternal illnesses, administration of specific substances and other factors not yet identified. All these factors are termed primary causative agents. Secondary causative mechanisms in the production of the most common of all malformations, the cleft lip, can be attributed to the arterial system. In the early stages of embryological development the facial processes are fed by the internal carotid artery via branches of the stapedial artery (passing through the opening of the primitive stapes). Toward the end of the second month the stapedial artery is reabsorbed, but the blood supply to the terminal branches is normally ensured by anastomosis from the external carotid artery. This radical change of source of blood supply at the period when facial processes normally fuse could, under harmful stimulation or some evolutionary disturbance, be the determining factor in the lack of fusion which results in a congenital cleft of the lip.—*C. C. Alling.*

■ Cortisone in Bell's Palsy. Annotations. Lancet 264:1188 June 13, 1953.

Many different pathological processes can cause paralysis of the facial muscles, but in most cases the cause appears to be an entirely peripheral lesion of the facial nerve. Two theories of origin have been evolved: (1) It is caused by an inflammatory process in the nerve and its sheath. (2) It is caused by a local ischemia. Most workers, however, agree that the nerve is compressed by the fallopian canal and that this compression contributes to the impairment of neural function. Most patients with Bell's palsy recover spontaneously. Recovery, which usually begins about three or four weeks after the onset of the palsy, as a rule is complete.

Rothendler, believing that this type of palsy is due to a nonspecific acute inflammatory reaction, decided to try the effects of cortisone. After treating six cases, he expressed the view that cortisone relieves the acute edema and inflammatory reaction in the nerve and its sheath and that the success of this treatment is prima facie evidence in support of the hypothesis that the cause is an inflammatory reaction.—*K. Tessler.*

■ The Restoration of Function After Large Operations About the Face and Jaws. Frank Coffin. J. Laryng. & Otol. 67:no. 4 April 1953.

It is a reasonable prophecy that the dental prosthodontist will be called on to carry his skill and knowledge far beyond the time-proven technic of immediate dentures and into the realm of preoperative restorations for major surgical defects, particularly those involving the head. In this field, he will become an invaluable ally of the surgeon who these days must frequently perform radical excision of malignant neoplasms. For the patient, he may be able to preserve a greater measure of function, obtain a more pleasing cosmetic result—transitory or permanent—and even help to protect against infection, dehydration and reduced intake of nourishment by the natural route.

In case of surgical removal of the hard palate, the prosthodontist can construct a plastic restoration one week or more before the operation. This technic not only permits adjustment of areas of irritation at a most judicious time but also allows the patient to accustom himself to the appliance. The appliance must, of course, be accurate in fit and light in weight. For various reasons, the patient's old dentures are seldom serviceable.

The prosthodontist can also plan with the surgeon the extent of the excision and the preservation of those tissues necessary for the satisfactory retention of the appliance in cases, for example, involving removal of the hard palate, the buccal part of the cheek or the soft palate.

Polythene, a synthetic plastic which has the texture, waxy, unwettable surface and general appearance of paraffin wax but is much stronger and melts at about 150° C., has given encouraging results in cases of immediate reconstruction of the mandible after rather extensive resection. The material appears to be well tolerated by the tissues and even under such adverse conditions as an intraoral graft has remained *in situ* for 12 months.—*Gordon B. Johnson.*

■ Submaxillary Gland Tumors. Walter B. Hoover. Surg. Clin. N. America 33:671 June 1953.

The submaxillary gland may produce a tumefaction in the neck. The most common causes of swelling or distention are: (1) obstruction of the duct, (2) calculi, (3) inflammation, (4) extension of an inflammatory process from neighboring lymph nodes or tissues, and (5) an obstruction of the duct as a result of a new growth in the floor of the mouth. The most common single cause of swelling of the submaxillary salivary gland is mumps.

The symptoms of obstruction of Wharton's duct are distinctive, and a diagnosis usually can be made quickly by local examination. These symptoms are swelling and pain. In about two fifths of the patients observed with salivary calculus, no appreciable infection was associated with the calculus. In about three fifths there was clinical evidence of infection with at least some purulent or cloudy secretion associated with the calculus; in some there was severe cellulitis and abscess formation. With bimanual palpation, the gland and duct can be pressed between the fingers; on visual examination the swelling of the submaxillary glands is readily noted. Further exploration and examination can be carried out by probing, roentgenographic studies and sialograms.

The treatment for obstruction of the duct is the removal of the obstructing object by means of a probe, surgery or dilation of the duct. If calculi become multiple or the gland extremely fibrosed from repeated infection, removal of the gland is the treatment of choice.

True neoplasms of the submaxillary gland occur relatively infrequently.—*K. Tessler.*

■ Use and Abuse of Blood Transfusion. Bernard Straus and Jose M. Torres. J.A.M.A. 151:699 Feb. 28, 1953.

The increased availability of blood since the widespread establishment of blood banks has resulted in an enormous increase in the use of blood transfusion in clinical medicine. In the Veterans Administration hospitals since 1949 there has been a utilization of 14,000 to 16,000 pints of whole blood monthly. While the greater utilization of blood has produced a significant improvement in the management of hemorrhagic states and in surgical practice, it has resulted in an over-all increase in transfusion accidents and disease that has given rise to widespread apprehension. Among the complications of transfusions that have been observed at the Veterans Administration Hospital, Bronx, N. Y., in a two year period, are various reactions, such as pyrogenic, hemolytic sensitization and speed reactions, and diseases, such as malaria, homologous serum hepatitis, transfusion hemochromatosis and hemoglobinuric nephrosis.

The uses of blood are various. Ready availability often inspires the familiarity that breeds contempt. The meticulous attention to detail

that is essential to keep transfusion accidents at a minimum unfortunately is not always observed. Since blood is a commodity and an essential therapeutic agent that is in short supply, its use for trivial purposes may deprive patients who are urgently in need of blood of a life-saving treatment.

It was thought of value to analyze a consecutive series of requests for transfusion from approximately 100 patients with the idea of determining the indications of need, the benefit derived and the incidence of reactions. In a three week period, 399 units (500 cc. each) of blood were requested from the blood bank for 136 patients. The fact that of the total number of units 27.3 per cent were returned indicates that insufficient thought had been devoted to the ordering of blood. Approximately 13 per cent of the blood administered was not indicated according to objective criteria. There were ten transfusion reactions in this series, which included homologous serum jaundice in three cases and pulmonary edema in two cases. One patient with pulmonary edema died, and another survived.

Blood transfusions are often ordered promiscuously and administered without regard for proper indications. A greater respect for the dangers of transfusion and attention to proper indications for the use of transfusions will result in fewer accidents and diseases secondary to this procedure. It will also conserve the limited supply of blood and aid in relieving overtaxed hospital budgets. Finally, the teaching of the proper use of blood transfusion to hospital staffs should be encouraged and extended.—*C. Dean Couch, Jr.*

■ REPAIR OF UNILATERAL CLEFT LIP—ADVANTAGES OF LEMESURIER TECHNIQUE USE OF MUCOUS MEMBRANE FLAPS IN MAXILLARY CLEFTS. Thomas B. Bauer, Harold M. Trusler and Sanford Glanz. Plast. & Reconstruct. Surg. 11:56 Jan. 1953.

The purpose of this paper is to analyze the experiences of the authors over a 15 year period with the problem of the unilateral cleft lip deformity. For the initial 11 years of this period, a modification of the Blair-Mirault technic was employed. An occasional straight line repair, similar to the Rose method, also was used. Some of the results produced by these methods were quite satisfactory, but the over-all picture was somewhat disappointing. For the last four years a slight modification of the LeMesurier-Hagedorn technic has been used. This procedure has given consistently better results than those obtained by any other method.

The advantages of the LeMesurier-Hagedorn method are: (1) The lower third of the lip has an adequate fullness. (2) The vermilion line has a smooth horizontal sweep across the center portion of the lip, becoming a moderate Cupid's-bow. (3) A "step line" scar avoids the characteristic appearance of the cleft lip deformity. (4) The portion of the lip lateral to the cleft does not have a tendency to droop. (5) An appearance of a more normal philtrum is produced. (6) The lip as a whole seems to be well balanced and in most cases is of normal length. In conjunction with the surgical technic for the lip repair, adjacent mucous membrane flaps may be used to bridge the gap in the wide maxillary cleft, to support the lip and to provide attachment in the closure of the mucous membrane. It is important to correct the nasal deformity at the same time.—*C. Dean Couch, Jr.*

■ A STAINLESS STEEL MESH PROSTHESIS FOR IMMEDIATE REPLACEMENT OF THE HEMIMANDIBLE. Joseph N. Attie, Andre Catania and Charles B. Ripstein. Surgery 33:712 May 1953.

An increasing number of jaw resections are being performed for malignant disease. In the resection of segments of the lower jaw, immediate fixation of the fragments is necessary to prevent deviation which results from unopposed muscle pull and scarring.

The ideal replacement for a resected portion of the mandible is autogenous bone. Immediate bone grafting, however, is not always feasible. The mucosa of the mouth is often entered with resulting oral contamination. In resection of the mandible for malignant tumors, adequate time must elapse to insure nonrecur-

rence. In cases where large doses of irradiation are employed, changes in the soft tissues prevent the use of an immediate bone graft.

In order to maintain normal anatomic relations, a variety of prosthetic appliances have been devised for temporary or permanent mandibular replacement. An inexpensive, easily constructed, light, rigid prosthesis was used in the case of a 13 year old boy to replace nearly half of the mandible, resected because of an extensive ameloblastoma.

Heavy stainless steel mesh (no. 20 M) was used. With clinical measurements and roentgenographic studies as a basis, a drawing in actual size of the projected prosthesis was traced on the steel mesh. The tracing was then enlarged 1 cm. on all sides to allow for folding of the mesh and 1.5 cm. anteriorly for attachment to the mandible. The completed prosthesis, prepared a few minutes immediately before the operation, was relatively light, inexpensive and readily autoclaved. When the edges were folded over, it was rigid and strong.

After removal of the specimen, the prosthesis was placed into the defect and was fixed anteriorly to the mandible by two wire ligatures passed through the open portion of the mesh and the drill holes into the mandibular fragment. The periosteum was sutured over the implant, and the wound was closed. To prevent deviation of the mandible and to maintain normal occlusion, the jaws were wired for a period of ten weeks.—*C. Dean Couch, Jr.*

■ In-Continuity Radical Neck Dissection for Malignant Tumor of the Head and Neck. James M. Ovens. J. Internat. Coll. Surgeons 19:599 May 1953.

Theoretically the ideal operation for carcinoma involves removal of the local tumor by a generous margin, removal of the regional lymph nodes and removal of any intervening tissues that contain lymphatics. The classic operation for cancer is removal of the primary tumor, the regional lymph nodes and intervening lymph-bearing tissue. Carcinoma arising in the head and neck is exceptionally amenable to this classic type of cancer operation. Even in the terminal stages of cancer of the head and neck, distant metastases are rare. Fewer than 20 per cent of the patients give evidence of distant metastases even in the terminal stage of the disease.

Many carcinomas arising in the head and neck and particularly in the intraoral cavity are better treated primarily by irradiation of the initial tumor than by surgical intervention. After the primary lesion is brought under control by means of irradiation, surgical intervention may become a necessity because of recurrence of the tumor or because of radionecrosis. If an operation is necessary because of recurrence of the primary tumor, an in-continuity type of radical neck dissection with removal of the residual carcinoma may well be the therapy of choice.

Generally speaking, radical neck dissection does not become necessary in the treatment of carcinoma of the lip if adequate local therapy and surgery—roentgen-ray or radium—have been carried out. Extensive lesions on either side of the midline, with or without lymphadenopathy, should be removed with an in-continuity type of radical neck dissection. If the lesion occurs in the midline, dissection of the lower lip and bilateral dissection of the suprahyoid region should be employed.

Carcinoma of the gingiva is best treated surgically. When bone involvement has taken place, an in-continuity operation should be employed, including both resection of the involved side of the mandible together with the contiguous floor of the mouth and buccal mucosa and radical dissection of the adjacent portion of the neck.

Carcinoma arising in the floor of the mouth, particularly in the earlier stages, is excellently treated by irradiation therapy, particularly with a low-intensity implant. If the lesion has spread to the mandible and particularly if the mandible has been involved by actual penetration, the treatment of choice is an in-continuity radical neck dissection.

For the most part, the treatment of carcinoma of the tongue is irradiation. If the carcinoma is in the anterior third of the tongue, local wide surgical excision or a low-intensity

radium implant is the treatment of choice. As the lesion progresses posteriorly, the treatment of choice for the primary lesion is irradiation. A preliminary low-intensity radium implant followed in approximately six to eight weeks by hemiglossectomy with in-continuity radical neck dissection is well employed in the treatment of carcinoma on the lateral border of the middle and posterior thirds of the tongue.—*C. Dean Couch, Jr.*

■ CONGENITAL EPULIS. R. Philip Custer and John A. Fust. Am. J. Clin. Path. 22:1044 November 1952.

The tumors of congenital epulis are generally located in the region of the incisors, some dangling from a slender stalk, others being more firmly fixed by a broad pedicle. Of 44 tumors with a specified location, 34 originated from the maxilla and 10 from the mandible. They varied in size from about 5 mm. in diameter to 9 by 6 by 4 cm. Almost all of the tumors occurred in females, none recurred after excision, and subsequent dentition was rarely impaired.

Viewed histologically, the tumors were overlaid by gingival mucosa, the stratified squamous epithelium being separated from the tumor cells by a zone of connective tissue of varying thickness. Numerous tumor cells were elongated and arranged in fasciculi. Vascular channels were numerous but devoid of nerves. Epithelial inclusions were noted, the cell nest being similar to tooth bud epithelium as it occurs near developing teeth and ameloblastomas.

There has been little agreement regarding the histogenesis of the tumor. It is probable that the tumors arise as malformations of the dental blastema; that is, they represent merely malformed teeth and, therefore, should be regarded as a form of embryonal hamartoma rather than as a true neoplasm. In support of this concept is the fact that they occur most frequently near the midline on the maxilla, the most common site of supernumerary teeth. —*C. Dean Couch, Jr.*

■ CLEFT LIP AND PALATE AND PARENTAL AGE: A STATISTICAL STUDY OF ETIOLOGY. W. G. McEvitt. Plast. & Reconstruct. Surg. 10:77 August 1952.

The cause of cleft lip and palate is still imperfectly understood. A century of study has eliminated superstitions and unwarranted assumptions, but a final answer to the problem is still being sought. Several observers have believed that the parents of children with cleft lip or palate were of greater than average age. To verify this opinion, an analysis was made of 282 cases of cleft lip and palate; the cases were not selected but were taken in chronological order as they were listed in the files of the Straith Clinic. As a control group, the birth registrations of the Detroit Health Department were tabulated. The comparative analysis of these two groups revealed that parental age had no bearing on the incidence of cleft lip and palate.

Other factors theoretically considered as possible causes of cleft lip and palate, for example, intrauterine trauma, dietary deficiencies of the mother, communicable diseases such as German measles in the mother, seemed to have no basis in fact.

The only causal factor for which there was evidence was heredity; however, the incidence even among children of a deformed parent is not great, although it has been estimated at 20 times as common among the children of afflicted parents as in the general population. Any unborn child has about one chance in 750 of being born with a cleft lip or palate. If the gene is known to be present in the family, however, the odds are possibly 50 to 1 that it will be present in the offspring.

Parents should be assured that this deformity is not the result of wrongdoing on their part and that it is not caused by maternal impressions, by syphilis or by any other known communicable disease. Young parents who have one afflicted child and hesitate to have another should be told that statistically they have all the odds in their favor. The same advice may be given to afflicted adults who are considering marriage unless both prospective parents are afflicted.—*C. Dean Couch, Jr.*

■ HEADACHES AND FACIAL PAINS IN CERVICAL DISCOPATHY. E. Neuwirth. Ann. Int. Med. 37:75 July 1952.

Syndromes resulting from pressure on nerves by lesions of the cervical spine do not consist only of distinctive segmental sensory, motor and reflex changes affecting the arm. Sometimes the chief symptoms are pains in the precordium, face or cranium. These ectopic pains result from the involvement of sympathetic nerve fibers. In the head and face, the pain follows the distribution of blood vessels. Therefore, in all cases of headache and facial pain of obscure origin, attention to the cervical spine is an important part of diagnosis.

Craniofacial pain due to disease of the cervical spine is constant, dull and deep-seated. It tends to be aggravated by many factors, such as emotional upsets, straining and movements of the head and neck.—*C. Dean Couch, Jr.*

■ LABORATORY AND CLINICAL STUDIES ON ERYTHROMYCIN. T. H. Haight and M. Finland. New England J. Med. 247:227 August 1952.

Erythromycin is a new antibiotic produced by an organism isolated from a soil sample collected on the island of Panay in the Philippine Islands. In a study of the laboratory and clinical aspects of erythromycin, pneumococci and Group A hemolytic streptococci were found to be the organisms most sensitive to this antibiotic. The other streptococci, staphylococci and neisseria were less sensitive, as were strains of hemophilus and diphtheria bacilli. Coliform bacilli, *B. proteus* and *B. pyocyaneus* were resistant.

Erythromycin was essentially similar in its activity to penicillin. It was more active than the wide-spectrum antibiotics against gram-positive organisms, but less active against the gram-negative coliform bacilli and about equally active against strains of hemophilus bacilli.

This antibiotic is taken by mouth; peak blood levels were observed between one and two hours after a dose; no activity could be demonstrated after four to six hours. Various dosage schedules were used, varying from an initial dose of 200 mg. to 500 mg. followed by 100 mg. to 250 mg. every three hours. Larger doses are now being used by the authors for patients with staphylococcal infections.—*C. Dean Couch, Jr.*

■ FURTHER OBSERVATIONS ON THE USE OF AUTOGENOUS CARTILAGE GRAFT IN ARTHROPLASTY OF THE TEMPOROMANDIBULAR JOINT. J. J. Longacre and Ray F. Gilby. Plast. & Reconstruct. Surg. 10:238 October 1952.

Two and a half years ago the authors first employed autogenous cartilage in arthroplasty of the temporomandibular joint. Cartilage implants were used for arthroplasty under the following conditions: (1) complete bony ankylosis following infection of the temporomandibular joint, (2) bilateral fracture-dislocation with ankylosis, (3) chronic arthritis of the temporomandibular joint, (4) fracture-dislocation with avulsion and mesial displacement of the condyle.

In the bilateral cases where cartilage was used, function has remained excellent; and no tendency has been evident in these patients toward the development of open bite or retrusion. Because the upper approach was utilized, the accurately fitted cartilage implants have not shown any tendency to shift.

The follow-up study of the unilateral cases in which cartilage graft was used showed that the function has remained excellent, but there has been a slight drift (2 degrees) toward the opposite side. This drift has not been sufficient to reproduce the flattening of the opposite side of the face nor the facial obliquity which were present in these cases preoperatively, nor has it been sufficient to produce any disturbance in the mechanics of the opposite normal joint. This slight tendency to drift may be prevented in the future if the graft is anchored securely with fascia lata to the upper fragment of the ascending ramus of the mandible.

These results have been obtained because the interposition of cartilage allows the residual condylar neck or ascending ramus to act as the fulcrum and the mandible to retain its function as a lever of the third class.—*C. Dean Couch, Jr.*

■ THE EFFECT OF ANTIBIOTIC DRUGS ON BLOOD CLOTTING: CLINICAL OBSERVATIONS AND A RÉSUMÉ OF RECENT LITERATURE. A. M. Miller and H. E. Bass. New York State J. Med. 52:1423 June 1, 1952.

The belief that antibiotic therapy disposes to thrombo-embolism is rather widespread. In order to determine whether antibiotic therapy influences determinations of prothrombin time, bleeding time, clotting time and platelet count, laboratory determinations were made on eight patients who received therapeutically effective amounts of penicillin, streptomycin, chloramphenicol and aureomycin singly or in combination. The average daily dose was 600,000 units of penicillin, 2 gm. of streptomycin and 3 gm. of chloramphenicol or of aureomycin. None of the patients had blood dyscrasias or other conditions that might have influenced the laboratory test under investigation. There was no change in platelet count, bleeding time or clotting time of any patient. In six patients no change was found in the prothrombin time. In two patients an increase in prothrombin time occurred after the sixth day of treatment.—*C. Dean Couch, Jr.*

■ EN BLOC RESECTION OF CANCER OF THE MOUTH AND CERVICAL LYMPHATICS WITH PRESERVATION OF THE MANDIBLE. Danely P. Slaughter and Harry W. Southwick. Ann. Surg. 136:957 December 1952.

Within the past decade the fundamental concept of the surgical approach to cancer, that is, the resection of the primary tumor and its lymph node echelons together with the intervening lymphatic channels, has been extended to include the surgical treatment of intraoral neoplasms. The *en bloc* operation consists of a resection of the mandible, or a portion of it, including radical neck dissection to remove primary lesions. A definite cosmetic deformity exists after surgery. This paper presents a technic by which the mandible is preserved.

The procedure is limited to lesions which involve the tongue from the tip to the base, or to the floor of the mouth immediately adjacent to the tongue, provided there is at least a centimeter or more of grossly normal tissue between the lesions and the margin of the gingiva.

The surgery consists of a radical neck dissection with "in continuity" excision of the involved intraoral parts; the sparing of the mandible is accomplished by entrance into the mouth through a subperiosteal approach, which allows the floor of the mouth and the tongue to be displaced downward into the neck. Such exposure permits excision under conditions of exteriorization and actually affords a more facile approach than that achieved in a transoral local excision of tumor. Reconstruction after resection of this type is not extremely difficult, and the eventual cosmetic and functional end result, that is, an intact mandibular arch, appears to be worth while.—*C. Dean Couch, Jr.*

■ TRIGEMINAL NEURALGIA: A REVIEW OF 689 CASES WITH FOLLOW-UP STUDY ON 65 PER CENT OF GROUP. M. M. Peet and R. C. Schneider. J. Neurosurg. 9:367 July 1952.

Data on 689 cases of trigeminal neuralgia were collected during the 10 year period from 1938 to 1948. Of this number, 553 had been subjected to a trigeminal rhizotomy, 49 had been given alcohol injections and the remaining 87 had received no treatment. Follow-up information was secured by a questionnaire with a 69 per cent response from the patients who had had a trigeminal rhizotomy, a 55 per cent return from those who had had alcohol injections only and a 41 per cent response from the patients who had been untreated. Of the 36 untreated patients who replied, 4 had experienced complete spontaneous remission from pain, 20 had suffered recurrence of severe pain, 3 had been operated on with resultant relief from discomfort, and 9 had received alcohol injections with complete relief from discomfort in 5 instances.

The impression gained from the data was that trigeminal rhizotomy is a much more satisfactory procedure than alcohol injection in the typical case of trigeminal neuralgia; there was complete relief from pain in all but 5.4 per cent of the patients operated.—*C. Dean Couch, Jr.*

Announcements

■ American Dental Association Replies to A.M.A. on Definition of Oral Surgery

A reply will be sent to the American Medical Association's House of Delegates concerning its recent definition limiting the practice of oral surgery, it has been announced by the American Dental Association.

During its 94th annual session in September, the A.D.A. House of Delegates recorded its strong objections to the following definition adopted by the A.M.A.:

"Dental-oral surgery is to be limited to diseases of the teeth and jaws and lesions of contiguous soft tissues related to diseases of the teeth and jaws but excluding malignancies."

The official reply of the American Dental Association, prepared by the Special Committee on Problems in the Field of Oral Surgery, reads in part:

"The definition of oral surgery offered by the American Medical Association is not acceptable as a substitute for the definition offered by the American Dental Association for a variety of reasons. The definition is not well-conceived nor is its language precise and exact. The exclusion of 'malignancies,' for example, from the scope of oral surgery should not be subject to the unilateral pronouncement of professional groups. As the malignant character of a lesion frequently can not be determined until after the initiation of surgery, the dental profession takes the position that malignant lesions should be treated under procedures determined by, and acceptable to, the health team at the local level which is concerned with the total health care of the patient."

■ American Society of Oral Surgeons Announces New Officers

The American Society of Oral Surgeons, which met October 21-24 in Houston, Texas, announces the following roster of officers for the coming year:

Don H. Bellinger of Saginaw, Mich., president;
C. Stanley Rice of Beverly Hills, Calif., president-elect;
Harry M. Seldin of New York City, vice-president;
Frank B. Hower of Louisville, Ky., secretary-treasurer;
Miss Ruth F. Whalen of Richmond, Va., executive secretary;
W. T. Foster of San Antonio, Texas, new council member.

The Society will meet Wednesday through Saturday, November 3-6, 1954 in Miami, preceding the American Dental Association meeting.

■ Graduate Program in Oral Surgery Planned by University of Kansas City School of Dentistry

A two-year graduate program in oral surgery leading to a master's degree will be offered beginning with the fall term by the University of Kansas City, School of Dentistry. The program includes one year of academic work in the basic sciences and one year of residency at General Hospital.

As the class will be chosen in March, interested persons are advised to write as soon as possible to John D. Gehrig, director of oral surgery, The University of Kansas City School of Dentistry, 1108 East Tenth Street, Kansas City, Mo.

■ Efficient Use of Hospital Personnel Urged

Dentists and physicians attached to hospital staffs have been urged by the Health Resources Advisory Committee to "modernize their technics of personnel utilization" in order to relieve the shortage of graduate nurses. The new booklet, *Meeting Your Hospital Personnel Shortage*, prepared by the committee, suggests that a patient should be taught to do for himself many things that customarily have been done for him by nursing personnel.

Professional staff members are also urged to conserve personnel by:

"a. Reviewing daily orders and standing orders for patients, discontinuing and avoiding the unnecessary orders, and making a clear distinction between emergency and routine orders.

"b. Facilitating prompt discharges and admissions according to hospital policy.

"c. Recognizing the economy of scheduling hospital rounds, treatments and surgical procedures to fit into essential hospital routine.

"d. Cooperating with the standardizing of supplies and equipment and using stock items whenever possible.

"e. Completing medical reports promptly.

"f. Teaching patients self care and the activities of daily living. This is an important part of early ambulation and rehabilitation.

"g. Requesting private duty nurses only when this is essential to the safety and welfare of the patient."

■ Endowment for Theodor Blum Oral Surgery Award Presented to University of Pennsylvania

A fund for the establishment of the Theodor Blum Oral Surgery Award was presented to the University of Pennsylvania School of Dentistry October 28 at a dinner honoring Dr. Blum. Lester W. Burket, dean of the School, and 300 friends and colleagues of Dr. Blum attended the dinner. The award is to be given annually to a senior student at the School, from which Dr. Blum was graduated in 1909.

■ F.D.A. Warns of Reactions to Penicillin Preparations

The division of antibiotics of the Food and Drug Administration has issued a statement citing reports of acute anaphylactic reactions to penicillin preparations. In most of the fatal cases the drug was administered intramuscularly, the statement announced.

The F.D.A. has further cautioned manufacturers of penicillin preparations that their labels must inform the dentist or physician of the possibility of such anaphylactic reactions following the administration of penicillin.

The label or brochure must warn that: "The injection of penicillin in rare instances may cause acute anaphylaxis. The reaction appears to occur more frequently in patients with bronchial asthma, other allergies, or those who have previously demonstrated a sensitivity to penicillin. Care should be taken to avoid accidental intravenous administration, and resuscitative drugs, such as epinephrine, antihistamines, aminophylline, etc., should be readily available for emergency intravenous administration."

Serious reactions have occurred also following the oral administration of tablets or troches, inhalation of aerosols and instillation into the sinus cavities.

■ Society for the Advancement of General Anesthesia in Dentistry to Meet March 22

The spring meeting of the American Society for the Advancement of General Anesthesia in dentistry will be held Monday evening, March 22, at the Shelburne Hotel, New York City.

"Respiratory Sounds During Inhalation and Intravenous Anesthesia" will be discussed by the featured speaker, Milton S. Travin of Brooklyn, associate visiting dental surgeon of Gouverneur Hospital, New York, and diplomate of the American Board of Oral Surgery.

Interested persons may apply for admission to the meeting by writing to M. Hillel Feldman, executive secretary, 730 Fifth Avenue, New York City.

■ Ohio State University Announces Postgraduate Courses

The College of Dentistry, Ohio State University, will present the following postgraduate courses during the coming term: oral surgery, February 15-19 and April 5-9 by Morgan L. Allison; general anesthesia, April 12-16 by Dr. Allison; clinical oral pathology and diagnosis, April 26-30 by H. B. G. Robinson, and anatomy of the head and neck, June 7-11 by Linden F. Edwards.

Each course will be conducted for five consecutive days, Monday through Friday, and the enrollment will be limited to approximately 10 in each class. Further information and application may be obtained from the postgraduate division, College of Dentistry, Ohio State University, Columbus 10.

■ Berkshire Conference in Periodontology, Oral Pathology Announced by Tufts College Dental School

The Division of Graduate and Postgraduate Studies of Tufts College Dental School will conduct the Fifth Annual Berkshire Conference in Periodontology and Oral Pathology June 20-24 at the Cape Codder Hotel, Falmouth by the Sea, Falmouth, Mass.

The Conference will consist of four days of lectures, seminars and panel discussions regarding clinical problems to be presented by teachers and clinicians in dentistry, medicine and their related fields. A special feature of the Conference will be a clinical and pathological seminar, with microscopes provided for all participants.

The curriculum has been arranged so that mornings and evenings are devoted to professional activities with afternoons open for recreation. This is a conference for general practitioners as well as those interested in a specialized practice.

■ Loyola of Chicago to Offer Course for Oral Surgeons

Chicago College of Dental Surgery, Loyola University, will offer a week-long postgraduate course in oral surgery March 22-27 by Joseph Kostrubala, to be limited to practicing oral surgeons. The course will present a review of pertinent surgical anatomy of the oral region and lectures on pathology and physiology, stressing infection, trauma, neoplastic diseases and congenital deformities. The students will perform the following types of operations in the laboratory on cadavers: open and closed reduction of mandibular fractures, partial resection of mandible with bone grafting and resection of maxilla for tumors. Registration may be made with the College at 1757 West Harrison Street, Chicago.

Editorial communications

■ ORIGINAL COMMUNICATIONS—This journal invites concise original contributions in the broad field of clinical and experimental surgery of the mouth and associated structures, including roentgenology, diagnosis, anesthesia and oral surgical pathology. Articles are accepted for publication with the understanding that they are contributed solely to the JOURNAL OF ORAL SURGERY. All manuscripts are subject to editorial modification. Neither the editors nor the publishers accept responsibility for the views and statements of authors expressed in their communications.

■ MANUSCRIPTS—Manuscripts submitted for publication should be sent to Fred A. Henny, Editor, Henry Ford Hospital, Detroit, Michigan.

Manuscripts should be typewritten on one side of the paper only with double spacing and liberal margins. The author's name and the abbreviated title of the article should appear at the top of each manuscript page. The original should be sent to the editor and a carbon copy retained by the author. Manuscripts will not be returned if accepted for publication.

References should be placed at the end of the article and should conform to the style of the Quarterly Cumulative Index Medicus; viz., name of author, title of article and name of periodical with volume, pages, month and year. They should be numbered and should appear in the same order as that of the superior figures inserted in the appropriate positions in the text.

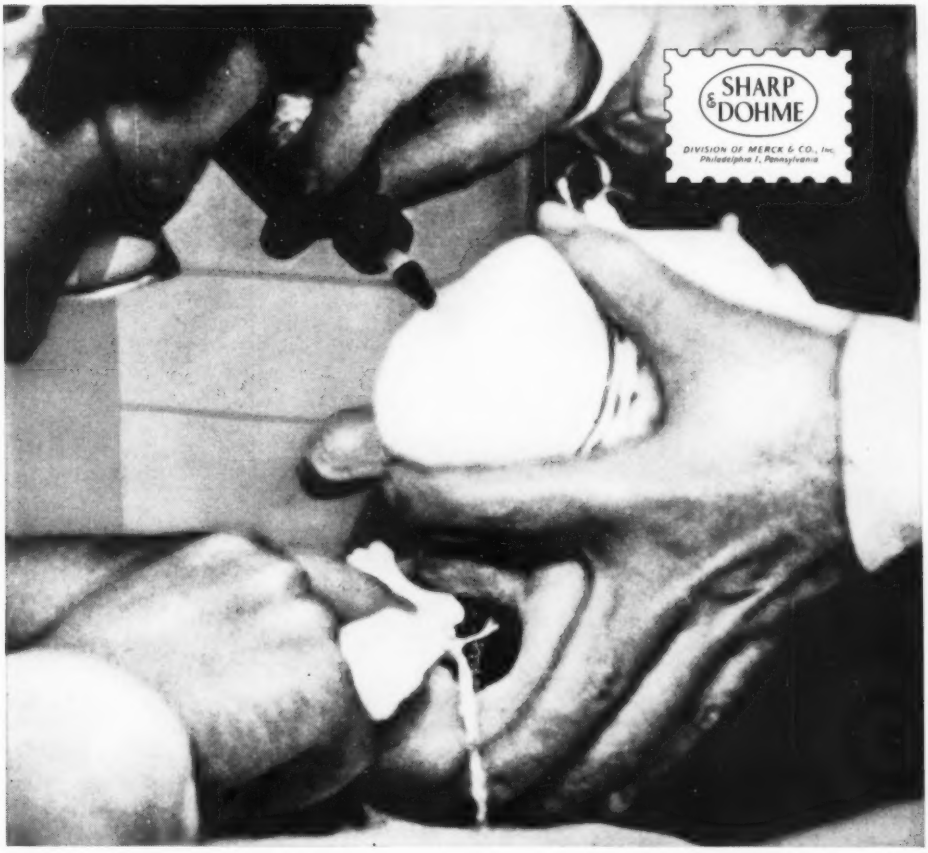
■ ILLUSTRATIONS—Illustrations accompanying manuscripts should be unmounted and numbered. The author's name should appear on the margin or back.

Authors should insert figure numbers at appropriate places in the text. The original drawings, or glossy print photographs of them, should accompany the manuscript. Legends for illustrations are to be typewritten in a separate list with numbers corresponding to those on the photographs and drawings.

A reasonable number of halftone illustrations will be reproduced free of cost to the author, but special arrangements must be made with the editors for color plates, elaborate tables or extra illustrations. Copy for zinc cuts (such as pen drawings and charts) should be drawn and lettered in India ink or with black typewriter ribbon (carbon paper placed with carbon against back of sheet for bolder type). Ordinary blue or colors will not reproduce. Only good photographic prints or drawings should be supplied for halftone work.

■ CASE REPORTS—Case reports will constitute an important department of the journal and the editors welcome case reports that are of unusual clinical value or that present exceptional conditions of interest.

■ EXCHANGES—Letters, exchanges, reprints and all other communications relating to the JOURNAL OF ORAL SURGERY should be sent to the American Dental Association, 222 East Superior Street, Chicago 11.



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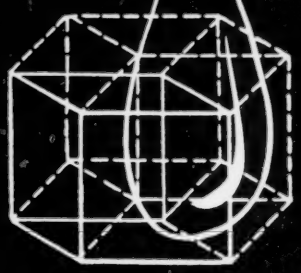

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† *Bragdon, C.: A Primer of Higher Space, New York, Alfred A. Knopf, 1923, Pate 1.*

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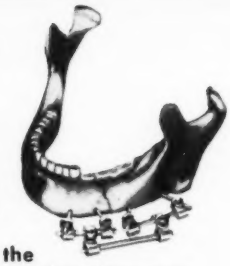

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